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U.S.A. Rep. Chief Bur. Entom. Plant Quarant., 1939, 253.
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NOTE :—In certain cases it is not possible to check references in the original publication. Such references are marked with an asterisk.

Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature, are, however, included in *Index Veterinarius* ; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

A list of annotations and reviews, classified according to subject, is now given in *Index Veterinarius*, being inserted at the end of each number. Such papers will not necessarily be dealt with in the *Veterinary Bulletin*.

Review on "Antibacterial Agents derived from Micro-Organisms"

Reprints of this review may be obtained from : Central Sales Branch (Imperial Agricultural Bureaux), Agricultural Research Building, Penglais, Aberystwyth. Price 1/- each.

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DISEASES CAUSED BY BACTERIA AND FUNGI

LITTLE, R. B. (1940). **A Discussion of the International Classification of the Streptococci of Bovine Mastitis.**—*J. Milk Technol.* **3.** 109–112.

This is a further note on the scheme proposed by LITTLE & MINETT [*V. B.* **11.** 69.] to secure uniformity in nomenclature of the streptococci which cause bovine mastitis. It is stated that Group III strains (*Str. uberis*) belong to Lancefield's serological group E.—JOHN FRANCIS.

*VELEFF, M. (1940). Contributo alla tecnica dell'esame batterieologico per la diagnosi della mastite streptococcica. **[Technique of Bacteriological Examination for the Diagnosis of Streptococcal Mastitis].**—*Clin. vet., Milano.* **63.** 174–177. [Translation of abst. in *Tierärztl. Rdsch.* **46.** 506].

1 ml. of milk from a suspected cow is placed in a test tube with 10 ml. of 2% glucose-serum broth and vaseline. After 18 hours' incubation at 37°C., it is sown out on solid blood agar or Pagnini's medium for the purpose of grouping and classifying the organisms. M. reports satisfactory results and suggests that the technique is simple.—E. C. HULSE.

TUJI, Y., & SATO, A. (1941). **On the Type Differentiation of Hemolytic Streptococci Isolated from Strangles, Pneumonia, and the Other Streptococcal Diseases of Equines. II. The Type Differentiation by the Serological Examination.**—*Jap. J. vet. Sci.* **3.** 71–88. [In Japanese: abst. from English summary]. [For part I, see *V. B.* **11.** 737].

A serological classification of types of equine haemolytic streptococci was made by Lancefield's method.

The G type of *Str. equi* showed considerable specificity. The C and F types, however, reacted strongly with the precipitinogen of all other types except Lancefield's group A. Types A and B of *Str. pyogenes* resembled types C and F of *Str. equi*, but also reacted slightly with Lancefield's group A. Lancefield's group A in turn failed to react with all types of *Str. equi*, but reacted moderately with the two types of *Str. pyogenes* and with Lancefield's group C. The latter, finally, reacted strongly with all types of *Str. equi* and *Str. pyogenes* and moderately with Lancefield's group A.—D. D. OGILVIE.

COBURN, A. F., & PAULI, R. H. (1941). **The Interaction of Host and Bacterium in the Development of Communicability by *Streptococcus haemolyticus*.**—*J. exp. Med.* **73.** 551–570.

From a study of an epidemic of human infection due to group A haemolytic streptococci type 12, the authors postulate that the micro-organisms possessed, as an apparently transient property, the capacity to establish themselves upon the tissues of a new host. This property of communicability played the leading part in the epidemic, and was independent of the micro-organisms' degree of invasiveness and of their power to produce toxin. A hypothesis is put forward to explain the genesis and disappearance of communicability.—E. COTCHIN.

HADLEY, F. P., HADLEY, P., & LEATHEN, W. W. (1941). **Variation in Peroxide Production by Beta Hemolytic Streptococci.**—*J. infect. Dis.* **68.** 264–277.

This paper reports the results of an examination of 30 strains of group A β haemolytic streptococci of types 1–14 for the production

of peroxide on benzidine blood agar. Among the 30 strains examined, 20 were found to produce peroxide, while ten strains, made up of eight type 3 strains (all the strains examined) and two type 5 strains, failed to show any evidence of peroxide production by the usual tests. All the non-peroxide-producing strains when grown on benzidine blood agar from 4–10 days, however, were shown to produce black peroxide-producing papillae (secondary colonies) from which stable peroxide-producing variants could be isolated. Although exhibiting no difference in colony morphology or fermentative ability, these variants differed from the parent non-peroxide-producing forms in cell morphology and virulence.

The authors concluded that dissociation of non-peroxide-producing streptococci to peroxide-producing variants, by means of secondary colony formation, had been established.

—ALEX. THOMSON.

WOOLLEY, D. W. (1941). **A New Growth Factor Required by Certain Hemolytic Streptococci.**—*J. exp. Med.* **73.** 487–492.

A new factor essential for the growth of haemolytic streptococci of Lancefield's group A in a synthetic medium of known constitution has been postulated. It has been isolated from liver as a water-soluble, alcohol-insoluble, non-dialysable substance, which can be rendered dialysable by treatment with HCl in strong alcohol, but not by many less drastic procedures. It has not been identified with any of the known growth-promoting factors. The most active concentrated product so far prepared exhibited maximum effect at a concentration of 10 mg. per ml.—ALFRED EDEN.

SCHUMAN, R. L., & FARRELL, M. A. (1941). **A Synthetic Medium for the Cultivation of Streptococcus fecalis.**—*J. infect. Dis.* **69.** 81–86.

Growth of *Str. faecalis* upon a completely synthetic medium consisting of pantothenic acid, vitamin B_6, riboflavin, glucose, a salt mixture, and six amino acids, namely, arginine, glutamic acid, methionine, tryptophane, tyrosine and valine, was estimated by a photoelectric nephelometer to be quantitatively equal to that obtained on a complex, non-synthetic medium mainly composed of a gelatin hydrolysate and a purified liver concentrate. β-alanine could not serve as a substitute for pantothenic acid in the promotion of growth. Six streptococcal strains, belonging to Lancefield's groups B, C and D, readily survived past the fifth subculture on the medium, but group A strains required additional amino acids for the promotion of growth. The addition of various other substances, described by other workers as stimulating the growth of certain haemolytic streptococci, had no effect on the growth of *Str. faecalis*.—R. O. MUIR.

HIRST, G. K. (1941). **The Effect of a Polysaccharide-Splitting Enzyme on Streptococcal Infection.**—*J. exp. Med.* **73.** 493–506.

An extract of the heads of leeches, freed from hirudin by precipitation methods, contains, besides spreading factor, a powerful enzyme capable of splitting one of the linkages of the capsular polysaccharide of group A haemolytic streptococci, and also of decapsulating group A and group C haemolytic streptococci *in vitro* and *in vivo*. Since this extract, given intraperitoneally, protected mice and g. pigs against intraperitoneal infection with a virulent group C streptococcus, and had little protective action in mice against intraperitoneal infection with group A haemolytic streptococci, it is thought that, at least in such a mode of infection, the capsule of group C streptococci is largely, and of group A streptococci is only slightly if at all, responsible for the virulence of such organisms.—E. COTCHIN.

MOSS, E. S., SQUIRES, G. V., & PITTS, A. C. (1941). **Classification of Staphylococci.**—*Amer. J. clin. Path.* **11.** 857–863.

[Authors' conclusions copied *verbatim*].

From the results of this investigation we conclude that all coagulase-positive strains of staphylococci are pathogenic, but that a negative coagulase test does not exclude pathogenicity. Pigment production is strong evidence of pathogenicity, but non-pigment producers may also be pathogens. Although mannitol was fermented by a high percentage of the pathogenic strains, it was also fermented by non-pathogenic strains. This makes the mannitol fermentation less valuable as an indication of pathogenicity than the coagulase test because the latter rendered no false positives. The high percentage of hemolytic *albus* strains completely excludes this method as a means of determining pathogenicity. From our data it appears that the failure to produce abscesses

in white mice does not exclude pathogenicity in the human, although no coagulase-negative strains were abscess producers.

These studies indicate, therefore, that coagulase activity and pigment production are helpful adjuncts in the determination of the pathogenicity of various strains of staphylococci for man.

PACKALÉN, T. (1941). **The Phenomenon of "Satellite Zones" Produced by *Staphylococcus aureus* on Solid Media.**—*Amer. J. Hyg.* Sect. B. **33.** 56–62.

An investigation of the "satellite haemolytic zones", produced within 3–7 days as protruding or discrete circular areas around the primary haemolytic zones on blood-agar plates sown with *Staph. aureus*, showed that similar clear zones could be obtained in a medium containing 0·5–8% agar and haemolysed blood either filtered through a Seitz EK filter or dialysed for three days. Clear areas appeared in the opaque agar when ascitic fluid, made opalescent by heating to boiling point, was substituted for blood and when colloidal substrates such as tragacanth or coagulated serum were used instead of the basic agar. Coagulated-serum plates saturated with fresh serum, even without added blood or haemoglobin solution, showed satellite transparent areas with marked depression of their surface. The agent causing the satellite zones was obtainable in a bacteria-free state by filtering staphylococcal broth cultures through a Seitz EK filter; it did not correspond with α or β staphylolysin or ordinary staphylococcal protease. The nature of the active principle remained undetermined.—R. O. MUIR.

CASMAN, E. P. (1940). **The Production of Staphylococcal Alpha-Hemolysin: the Rôle of Agar.**—*J. Bact.* **40.** 601–617.

Increased toxin production was obtained by making the gases concerned more available to broth cultures of staphylococci by bubbling the gases through the medium or by continuous rocking, without the addition of extraneous substances such as agar or cellophane. Dilution of the medium accelerated toxin production when bubbling aeration was used but not when the rocking aeration method was employed. Continuous gentle rocking of shallow liquid cultures of four staphylococcal strains resulted in greater toxin production than by the method of bubbling aeration and, while the toxin produced by the latter method did not equal in potency that obtained by the semi-solid agar procedure by the rocking aeration method, three of the four strains produced toxin of equal potency to that obtained in semi-solid agar cultures. Attention is drawn to the fact that the optimal initial mixture of oxygen and carbon dioxide for the production of α-haemolysin in a closed system varied with the total gas volume under which the organism was grown.—R. O. MUIR.

HARMS, F. (1941). Pneumokokkeninfektion beim Fohlen. [**Pneumococcus Infection in Foals**].—*Dtsch. tierärztl. Wschr.* **49.** 10–12.

After a brief review of the characters of the pneumococcus and of the diseases this organism produces in man, calves, and g. pigs, H. describes a case of pneumococcal infection in a foal. The foal was weak at birth and a swelling appeared in the left hock at the third day. This responded to treatment and for three weeks the foal appeared healthy. Further illness then developed and the foal died after eight days, with swelling of various joints. Autopsy showed thickened joint capsules containing flocculent dirty brownish-yellow fluid. Pleurisy, pneumonia, and pericarditis were noted and there was congestion of liver and spleen with haemorrhages under the capsule. The umbilical stump was thickened and purulent. The pneumococcus was obtained in almost pure culture from heart, liver, spleen, kidney, and pericardial fluid. *Streptococcus pyogenes* was cultured from the umbilical stump, but from no other site.

The origin of the infection could not be determined. Other deaths in foals from the same stud over a period had been due to a variety of bacteria, possibly bacteria existing normally as saprophytes. The importance of hygiene and nutrition in combating these troubles is therefore stressed.—H. E. HARBOUR.

ANDREWES, C. H., & LUSH, D. (1941). **Experimental Meningococcal Meningo-Encephalitis in Mice.**—*J. Path. Bact.* **52.** 85–90. [Authors' summary copied *verbatim*].

A strain of type III meningococcus proved to be transmissible in series through the brains of mice and capable of causing meningo-encephalitis which was often fatal. We failed, however, to cause infection of the meninges

when inoculations were made by routes other than the intracerebral. Some human and other sera neutralised the activity of infective brain suspensions when mixed with them and inoculated intracerebrally into mice; there was no correlation between this neutralising activity and agglutinin content.

*UMENO, S., NOBATA, R., & TERAMOTO, S. (1938). **A Case of Germination of Spores of B. Anthracis Stored for 41 Years.**—*Saikingaku Zasshi.* No. 512. [Abst. from abst. in *Kitasato Arch. exp. Med.* **16.** No. 4. p. 1 of absts.]

Anthrax bacilli, smeared on silk threads and kept in a test tube, were stored from 1897–1938. When taken out, the spores readily germinated, and the organisms showed typical morphology and were strongly pathogenic.

ROSENTHAL, L. (1941). **Action of Sporogenic Aerobic Bacilli on Living and Dead Bacteria.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 448–449.

Thirty-one strains of the *subtilis-mesentericus* group were tried against seven Gram-positive and seven Gram-negative species by making a pin-point inoculation of the sporogenic strain on the surface of a serum-agar plate evenly spread with a suspension of the test organism. After incubation, inhibition of growth was evidenced by a clear transparent zone surrounding the colony of the sporogenic strain, contrasting with the good growth of the test organism over the rest of the plate. The action of sporogenic strains on dead bacteria was studied by making a pin-point inoculation in plates of agar which were mixed with a thick suspension in saline of a culture of test organisms boiled for 5 min. After incubation the presence of clear transparent zones around the sporogenic colonies gave evidence of lysis. The results showed that the tested living Gram-positive organisms were more susceptible to the antagonistic action of the sporogenic aerobic bacilli than the living Gram-negative, but all the dead Gram-negative organisms were susceptible to the action of all sporogenic strains while dead Gram-positive were unaffected.—R. ALLCROFT.

STEWARD, J. S. (1941). **Bovine Tuberculosis: The Examination, under Field Conditions, of Bovine Expectorate and Discharges for *M. tuberculosis*.**—*Vet. Rec.* **53.** 521–527.

S. records the results of his examination by a variety of methods of expectorate, glandular and uterine discharge, urine, and faeces from cattle for *Mycobacterium tuberculosis.* He found the direct microscopic examination of sputum very satisfactory, only one out of 400 cases regarded as positive by this method proving negative P.M.

Where, however, the result is negative and suspicion persists, the sputum should be concentrated or a cultural examination made. 20% of negative cases proved positive to the concentrated sputum test. G. pig inoculation was only undertaken if all other methods proved negative and the symptoms shown by the cow justified extended investigation.

Expectorate from tuberculous cases varies considerably in appearance, but positive samples are generally white, yellowish, or golden. The quantity or the frequency of expectoration bears little or no relationship to the type or extent of the disease process. In the miliary type, for instance, there may be no expectorate until the disease process is advanced.

In discharge from a superficial lymph node, organisms are found only in small numbers. Seventy-nine samples of uterine and vaginal discharge were examined, 24 of which were positive. S. observed tuberculous lesions in foetal calves 6–7 months old, although there were no lesions in the uteri containing these calves.

The examination of urine proved of doubtful value. Of 64 samples taken from suspected cases of TB., only nine were positive.

Examination of faeces may reveal the existence of TB. or Johne's disease, but apart from being a means of differentiating between these two diseases should the animal be scouring, the method is of no practical value in the control of TB.—N. S. BARRON.

MACKAY, W. M. (1941). **Bovine Tuberculous Mastitis. A Review of the Position in the North-East of Scotland (Banffshire).** —*Vet. Rec.* **53.** 563–567.

M. describes observations on the clinical and pathological aspects of tuberculous mastitis, and also discusses TB. of bovine origin in human beings, pasteurization, and the methods of detecting tubercle bacilli in milk.

In Banffshire, 0·4% of the milch cow population has been found affected with udder TB.

Generally speaking, the clinical picture of

tuberculous mastitis is one of slowly progressive induration which frequently has its origin in the neighbourhood of the milk sinus. Some cases are, however, remarkably rapid and more than one quarter may be involved, in which case the supramammary gland is usually enlarged. The anterior quarters are more frequently affected than the posterior. M. did not observe any cases in animals under three years of age.

A brief description is given of the lesions of 16 selected animals out of a total of 92 which were slaughtered on account of tuberculous mastitis. In nearly every case there were extensive pulmonary or abdominal lesions, but changes in the supramammary gland were rare. If the lymphatic system was involved, however, and there were lesions both in the lymph node and the udder, then those in the latter were older. Such evidence, it is suggested, indicates that the organisms were conveyed by the bloodstream.

For the purpose of diagnosis M. considers that direct microscopic examination by the " cell-group " method remains the most satisfactory.—N. S. BARRON.

*HAUPT, H. (1940). Der gegenwärtige Stand der Bekämpfung der Rindertuberculose. [**The Present Position of TB. Control in Cattle in Germany**].—*Z. Tuberk.* **53.** No. 1–2. [Abst. from abst. in *Z. Fleisch- u. Milchhyg.* **51.** 91].

A survey of TB. control from a hygienic standpoint is given, with a discussion of Bang's and Ostertag's methods. Other methods of control in Germany are also discussed.

—E. C. HULSE.

*SCHREIBER, W. (1939). Histologische Befunde an anatomische unveränderten Lebern und Leberlymphknoten tuberkulöser Schlachtrinder. [**Histological Findings on Normal Livers and Lymph Nodes of Tuberculous Slaughter Cattle**]. —*Inaug. Diss., Giessen.* [Abst. from abst. in *Tierärztl. Rdsch.* **46.** 493–494].

During the course of tuberculous infection, the cells of certain organs show changes which are not characteristic of the disease. Tubercle bacilli which have invaded the bloodstream are found in completely normal organs. The macroscopically unchanged livers and liver lymph nodes of 32 cattle were examined for these microscopic changes. In the animal, TB. lesions were present in such organs as the lungs, intestines, and mammary gland and their associated l.nn., the kidneys, spleen, peritoneum, pleura, and bones. In most cases enlargement and discoloration of the liver and its l.nn. were observed. In other cases there was a marked increase of reticular tissue in the liver. In 15 cases histiocyte cell infiltrations were seen in the interlobular tissue. Shrinkage of the lobules as well as increase of the interlobular tissue was observed in addition to the other cellular changes. No tuberculous changes or tubercle bacilli were found in the liver tissue of any animal. On the other hand, TB. of the cortex of the hepatic l.n. with giant-cell formation and phagocytosis of tubercle bacilli was found in three cases and there were two further cases of amyloid degeneration of the periphery of the lobules.—E. C. HULSE.

*KLUGE, H. G. (1940). Ueber das Vorkommen und den Nachweis von Tuberkelbakterien im strömenden Blute bei Versuchstieren und Rindern. [**Occurrence and Demonstration of Tubercle Bacilli in the Circulating Blood of Experimental Animals and Cattle**].—*Inaug. Diss., Leipzig.* [Translation of abst. in *Berl. Münch. tierärztl. Wschr.* July 12th. 339. (1940)].

In no case was it possible to isolate tubercle bacilli from the circulating blood of 38 tuberculous g. pigs, nor from the carcass blood of six tuberculous g. pigs. Tubercle bacilli also could not be recovered from the blood of nine infected fowls, nor from the blood or bone marrow of the same fowls after death. Tubercle bacilli were never obtained from the circulating blood of two tuberculous cattle even though attempts were made daily for 42 and seven days respectively up to the time of natural death. They could, however, be demonstrated in the carcass blood and musculature of both these animals.

SFORZA, M. (1939). Sulla biologia di alcuni acidoresistenti isolati da lesioni nodulari di bovini in Eritrea. [**Biology of Acid-Fast Bacteria Isolated from Nodular Lesions of Cattle in Eritrea**].—*IV Congr. int. Pat. comp. 1939.* **2.** 241–248. [In Italian].

Acid-fast bacteria were isolated from nodular lesions in the lungs, liver, and lymph nodes of slaughter cattle in Eritrea, and in view of the

absence of any previous records of such conditions in Eritrea, it is considered that the cattle probably came from the Anglo-Egyptian Sudan. The lesions were of three types the most common being sharply circumscribed nodules containing more or less dense creamy-yellow pus. In other cases the lesions consisted of white connective tissue with one or more centres of caseation or suppuration, whilst in other cases they had a fibro-epithelioid character and a pearly appearance and resembled TB. nodules. The l.nn. of the affected organs were always involved.

Microscopic examination revealed the presence of acid-fast bacteria, some of which were filamentous and more or less branched whilst others were bacillary rods and resembled tubercle bacilli. The organisms could be cultivated in Petragnani's and Petroff's media and cultures developed in glycerinated potato or serum.

Three types of organisms were isolated by culture, the first type being considered as a species of *Actinomyces* with true filamentous branching but without mycelium formation, and therefore ascribed to the family Asteroides. These organisms had some pathogenicity for calves, rabbits, g. pigs, and mice, and were very pathogenic to monkeys, but nonpathogenic to dogs and fowls. The second type appeared to be bacteria intermediate in character between actinomyces and tubercle bacilli, but their definite morphological and cultural characteristics are considered to indicate that they are a true species. These organisms were pathogenic to laboratory animals and to some extent to calves, but not to goats, dogs, monkeys, or fowls. The third type were considered to be tubercle bacilli, probably of the bovine type, but it is noted that infected animals gave a reaction to avian tuberculin. These organisms were pathogenic to calves, rabbits, and g. pigs, but not to mice or fowls.—U. F. RICHARDSON.

LASZLO, F. (1941). Scheidentuberkulose bei einem Schwein. **[Vaginal TB. in a Pig].** —*Tierärztl. Rdsch.* **47.** 421–422.

An illustrated pathological description of a case of unstated history. No bacteriological diagnosis is mentioned.—J. E.

LOVELL, R., & WHITE, E. G. (1941). **Naturally Occurring Tuberculosis in Dogs and some other Species of Animals. Part II. Animals other than Dogs.**—*Brit. J. Tuberc.* **35.** 28–40. 1 appendix. [For part I, see *V. B.* **11.** 280].

Dysgonic bovine type tubercle bacilli were isolated by direct means from two cats, one of which had a tuberculous exudate in the peritoneal cavity and tuberculous mesenteric lymph nodes, the other showing lung lesions and a tuberculous pleural exudate. Specimens from two tuberculous sheep were examined; a eugonic bovine type of tubercle bacillus was recovered from the lungs of the first by g. pig inoculation, and a dysgonic bovine type of tubercle bacillus was isolated by direct means from a hepatic lymph node of the second. From a portion of the lungs of a goat, a dysgonic bovine type of tubercle bacillus was recovered. From five cases of TB. in the horse, strains of the bovine type were recovered, being of reduced virulence in three cases. The three cases of TB. examined bacteriologically, among 17 tuberculous mink, showed bovine type tubercle bacilli. A common finding in these mink cases was the enormous number of tubercle bacilli in smears. Six of the 17 mink had a tuberculous peritonitis, with greyish plaques on the parietal peritoneum, especially over the diaphragm, and a small quantity of greyish glutinous fluid, very rich in tubercle bacilli, in the peritoneal cavity. The danger of infecting fur-bearing animals by feeding them on raw meat to develop a good coat is emphasized.

There is an appendix, giving the symptoms and autopsy findings of the cases examined, and a useful list of references.—E. COTCHIN.

SCHMIDT, H. W. (1941). Tuberkulose beim Reh, ihre Bedeutung und Bekämpfung. **[TB. in Roe Deer].**—*Tierärztl. Rdsch.* **47.** 3–7.

S. reviews the recent literature on the subject of TB. in roe deer. A characteristic feature of infection is under-development of the horns. General emaciation is not observed until the last stages of the disease and the condition of the horns in the male animals is indicative of the degree of infection in a herd. Other indications of TB. in stags are sluggishness, a tendency to hide away from the rest of the herd, and sexual indifference.—E. C. HULSE.

I. CORPER, H. J., & COHN, M. L. (1940). **Life Expectancy of Infected Immune Guinea Pigs and Persistency of Specific Tuberculosis Immunity.**—*Amer. Acad. Tuberc. Phys.* **4.** No. 4. Reprint pp. 8.

II. Corper, H. J. (1941). **Certain Specific and Immunopathologic Features of Tuberculosis.**—*Amer. J. Path.* **17.** 681–696.

I. Small-scale experiments showed that the survival time of g. pigs against subcutaneous or intravenous injection of virulent human type tubercle bacilli may be increased by a single subcutaneous injection of avirulent human type tubercle bacilli, given one month prior to infection. Such an immunity did not appreciably diminish after 1–2 years, although the skin reaction to P.P.D. had by then become slight or negative.

II. The average survival time of g. pigs against subcutaneous or intravenous inoculation of highly virulent human type tubercle bacilli was prolonged by previous subcutaneous injection of avirulent human type tubercle bacilli. If large doses of virulent bacilli were inoculated intravenously into g. pigs thus "immunized", a proportion of them succumbed to an early lethal allergic intoxication, thus obscuring the immunizing effect. These lethal reactions could be prevented by desensitizing the g. pigs by appropriate injections of a filtrate prepared by growing tubercle bacilli on a non-protein nutrient medium. The specific immune protection, retardation of the tuberculous process and prolongation of life, was then displayed by the desensitized animals when they were inoculated intravenously with large doses of virulent tubercle bacilli. The problem of the nature of the relation between the allergic and the specific immunity reactions is considered.—E. Cotchin.

Gordon, R. F., Garside, J. S., Dobson, N., & Reid, J. (1941). **An Extensive Outbreak of Tuberculosis in Ducks.**—*Vet. Rec.* **53.** 575–580.

In the course of investigations in connexion with salmonella infection on a large duck farm, the authors removed 113 birds of 2–3 years old to the laboratory for observation purposes. Of these 29 were found P.M. to be affected with TB. The lesions are described. The various organs were affected as follows :– liver 22 times, lungs 20, air-sacs 20, spleen 13, peritoneum 9, and gizzard and kidneys twice.

Pathogenicity tests were carried out with strains grown artificially. Fowls proved very susceptible, three out of four developing a generalized infection in 5–10 weeks following intravenous, intraperitoneal, or intramuscular injection. Ducks, however, proved fairly resistant, only three dying out of 12 inoculated. Only one out of six rabbits inoculated became infected, which suggested to the authors that they were dealing with an atypical avian strain.

Attempts to establish a suitable method of tuberculin testing for ducks proved unsatisfactory.—N. S. Barron.

Lurie, M. B. (1941). **Heredity, Constitution and Tuberculosis. An Experimental Study. I. Inherited Native Resistance and Natural Respiratory Contagion. II. Inherited Native Resistance and Artificial Tuberculous Infection.**—*Amer. Rev. Tuberc.* **44.** No. 3. Suppl. pp. 1–67 and 68–79.

Lurie, M. B., & Zappasodi, P. (1941). **Heredity, Constitution and Tuberculosis. An Experimental Study. III. Experimental Study of Certain Factors Related to Hereditary Constitutional Resistance to Tuberculosis.**—*Ibid.* pp. 80–111.

I. Eight separate strains of rabbits were raised by constant inbreeding (brother-sister matings). Each successive generation was tested for resistance to TB. by direct inoculation of standard quantities of a bovine strain by the intravenous or intracutaneous routes, whilst the second generation of each family received a conjunctival instillation of similar quantities.

Subsequently a method was evolved for evoking natural respiratory contagion, with more striking results. A special cage was designed in which a number of individual compartments, constructed so as to avoid cross-infection and containing the receptor rabbits, adjoined a common run in which were placed donor rabbits infected intravenously with a small dose of the bovine tubercle bacillus : in this way the former were exposed to equal chances of infection by urine, faeces, and nasal discharges voided from the infected animals. Exposure to groups of donors in series was continued throughout the experiments, each of which lasted several months. The course of the disease was followed by a radiological examination of the chest, intradermal tuberculin tests, and by careful autopsy to determine the site and progress of the primary lesion.

It was found that resistance was largely controlled by the genetic constitution of the animals. In highly resistant families there was a localized, chronic, ulcerative phthisis of the reinfection type, while in susceptible families

there was a rapidly progressive, primary, generalized disease. Families of intermediate resistance were encountered in other groups. A histological examination of the lungs suggested that resistance to infection was largely governed by an ability of the mononuclears to inhibit the growth of tubercle bacilli.

II. Experiments were made to determine whether similar differences in resistance would be obtained when animals from different families were tested by the inoculation of uniform quantities of the same suspension of *Mycobacterium tuberculosis*. Resistance was assessed by the average survival rate and was of the same order as that which was found by natural respiratory contagion. Highly resistant families survived 276 ±25 days; intermediate families survived 165 ±30 days, and susceptible families 124 ±21 days. The differences were statistically reliable. Variations in resistance were also noted when animals were permitted to inhale known numbers of tubercle bacilli in the form of fine droplets [see also WELLS & LURIE—*V. B.* **12.** 136].

III. The highly resistant families responded to heat-killed tubercle bacilli by developing allergic sensitivity and high agglutinin antibodies with great rapidity; in addition the rate of development of local immunity as indicated by the effectiveness of the healing of regional lesions following cutaneous infection, was speedy. The converse held in regard to the families of low resistance. There was an inverse relationship between the spread of Indian ink in the skin and the period of survival of a given strain.—R. E. GLOVER.

BROOKE, W. S. (1941). **The Vole Acid-Fast Bacillus. I. Experimental Studies on a New Type of** *Mycobacterium tuberculosis*.—*Amer. Rev. Tuberc.* **43.** 806–816.

B. describes the cultural characters and pathogenicity to small animals of the vole strain of acid-fast bacillus for which the name *M. tuberculosis* var *muris* is proposed. Details are given of agglutinin-absorption experiments with sera prepared against various acid-fast bacilli. No significant difference could be found between the vole bacillus and human and bovine types of *M. tuberculosis*, but the vole bacillus was easily differentiated from *M. tuberculosis* (avian type), *M. phlei*, *M. smegmatis*, and the rat-leprosy bacillus.

The protein fraction of the vole strain was compared with proteins from the fixed mammalian types by quantitative skin tests in sensitized g. pigs. Animals injected with the vole strain showed maximum allergy to old tuberculin at about three months after inoculation and became negative after the sixth month. Such animals usually reacted to a vole tuberculin before they became sensitive to O.T.; conversely, vole tuberculin was as effective as O.T. in producing reactions in g. pigs infected with human and bovine type TB.

It is suggested that the vole tuberculin possesses a group and a specific protein, the latter being absent from O.T.—R. E. GLOVER.

MAGNUSSON, H. (1940). Pyämie beim Fohlen und tuberkuloseähnliche Herde der Schweine, verursacht durch Corynebacterium equi. [**Pyaemia in Foals and Tuberculosis-Like Foci in Swine, caused by** *Corynebact. equi*].—*Z. InfektKr. Haustiere.* **56.** 199–206.

This foal disorder has been reported from many parts of Europe and from North America. Some confusion over the identity of the organism was introduced by MIESSNER who regarded *Corynebact. equi* as a variant of *Corynebact. pyogenes*; M. here denies this, giving reasons.

The discovery of *Corynebact. equi* as a cause of localized lymph node lesions in swine in Denmark [see *V. B.* **11.** 77.] is described and also new work on its possible occurrence in swine in Sweden. In 235 cases, *Corynebact. equi* was isolated 71 times, while the bovine type tubercle bacillus was isolated 144 times, the avian type 84 times and the human type once.

Reference is made to the work of BRUNER *et al.* [*V. B.* **10.** 238.] on *Corynebact. equi*. —J. E.

DAVIDSOHN, I., & TOHARSKY, B. (1940). **The Production of Bacteriogenic Hemagglutination.**—*J. infect. Dis.* **67.** 25–41.

A bacterium was isolated from contaminated control serum used for typing human red blood cells, and classified by its morphology and cultural characters as belonging to the genus *Corynebacterium*, the authors naming it *Corynebact. hektoenii*. It was found to produce, after 5–165 days at 22°C., in the serum or plasma of man and certain animals, a new haemagglutinating property affecting the r.b.c. of all human groups and of the sheep and the g. pig. Haemagglutinin production was more frequent,

more rapid, and reached a higher titre in plasma than in serum. Culture filtrates were similar in effect. *Corynebact. hektoenii* and its filtrates also made the r.b.c. of man and certain animals panagglutinable, *i.e.* agglutinable by other r.b.c. antisera than the homologous antiserum. Haemagglutinins were equally readily produced in the serum and plasma of umbilical blood, usually devoid of antibodies, and, when adsorbed from such serum or plasma by r.b.c. they could be separated from them by Landsteiner's technique. Only *Pseudomonas pyocyaneus*, from various bacterial species tested for haemagglutinogenic properties, produced panagglutination under certain conditions.

The bearing of the formation of bacteriogenic haemagglutinins upon sources of error in blood grouping and in therapeutic administration of serum and plasma was considered. —R. O. MUIR.

LOBEL, L. W. M., VAN DER SCHAAF, A., & ROZA, M. (1941). Biologische mitigatie van malleusbacillen op rundergalhoudende voedingsbodems. III. Immunisatieproeven met levende avirulente bacillen bij cavia's en paarden. **[Attenuation of Glanders Bacilli on Ox-Bile Medium. III. Immunity Tests with Live Avirulent Bacilli on Guinea Pigs and Horses].**—*Ned.-ind. Bl. Diergeneesk.* **53.** 100–126. [English summary]. [For part II, see *V. B.* **11.** 582].

The authors refer to their previous experiments and describe further trials carried out at the Veterinary Institute at Buitenzorg. Groups of 9–12 guinea pigs were given 1–2 intramuscular or subcutaneous inoculations of large doses of living cultures of glanders bacilli rendered avirulent by 11 years' propagation on ox-bile medium. Four horses also were given two intramuscular injections and three were given two intravenous injections, at an interval of 35 days. Tests of immunity were made; the test dose was given to the g. pigs 32 or 62 days, and to the horses 43 days, after the last inoculation. No immunity was conferred. The immunizing power of the strains was not increased when they were later grown for one year on medium free from ox bile, nor when they were suspended in liquid paraffin. The avirulent bacilli remained viable in horses for some time, but their allergic power was lost and their power to produce complement-fixing antibody reduced.

Administration *per os* of 0·1 mg. of virulent culture bacilli to horses produced a state of complete allergy within two weeks, while the c.-f. reaction was strongly positive after four weeks. Animals artificially infected *per os* showed considerable differences in the course of the disease.—L. TOBBACK.

HEROLD, A. A., & ERICKSON, G. B. (1938). **Human Glanders: Case Report.**—*Sth. med. J., Alabama.* **31.** 1022.

A report of a fatal illness in a human being diagnosed as glanders on the evidence of the clinical manifestations and microscopic examination of smears from the lesions.

The illness is said to have been preceded by the loss of "several heads of stock" "all of them dying with severe catarrhal symptoms and profuse discharge from the eyes, nose and mouth", the animals being the property of the patient.

HURT, R. H., LEVINE, N. D., & GRAHAM, R. (1941). **Isolation of *Listeria* (*Listerella*) from the Chicken.**—*Amer. J. vet. Res.* **2.** 279–280.

The authors state that the infection now recorded is the second occurrence of listerellosis of poultry in the U.S.A. *L. monocytogenes* type 2, the ruminant type, was isolated from one bird. The flock consisted of 300 White Leghorn pullets about 7½ months old. There was a history of coryza from the age of three months and 50% of the birds died before an examination was made. The authors consider that the infection may have been a secondary one, following coryza.—C. V. WATKINS.

CRAIG, J. F., DAVIES, G. O., & MASSEY, K. M. (1941). **Infection of Calves with Bacterium enteritidis var. dublin.**—*Vet J.* **97.** 145–155.

A 20% annual loss in young calves had been occurring in a small herd of British Friesians over a number of years. The calves affected were those reared indoors while those allowed to run with their dams at pasture were unaffected. Symptoms occurred in the first eight weeks of life and resembled those associated with "white scour". Survivors did not thrive. P.M. examination was carried out on four calves. In all cases there was congestion of the intestinal tract and inflammation and sometimes haemorrhage in the abomasum and small and large intestines. The heart was flabby and the liver pale, the synovial membranes were

reddened and there was excess of synovia. Bronchopneumonia was encountered and sometimes the umbilicus was infected. *Salmonella enteritidis* var. *dublin* was grown from the heart blood and from various organs and lesions including an infected joint.

Although in one case infection was presumably contracted *via* the umbilicus, it appears that calves were also infected *via* the alimentary tract. An attempt, using cultural and serological methods, to show a possible reservoir of infection in the adult bovines proved unsuccessful. It was suggested that the boxes in which the young animals were housed probably harboured the organism.—K. C. SELLERS.

POMEROY, B. S., & FENSTERMACHER, R. (1941). **Paratyphoid Infection of Turkeys.**—*Amer. J. vet. Res.* **2.** 285–291.

The authors describe work on salmonella organisms from 44 flocks [see also *V. B.* **9.** 611]. In many cases two or more types were found in the same flock and in one instance a culture was mixed, containing *S. anatum* and two other strains, now named *S. litchfield* and *S. saint paul* [see also *V. B.* **11.** 734]. The authors confirmed that infective salmonella material on egg-shells may penetrate to the embryo.—C. V. WATKINS.

HINSHAW, W. R. (1941). **Cysteine and Related Compounds for Differentiating Members of the Genus Salmonella.**—*Hilgardia.* **13.** 583–621.

A review of the literature concerning the differentiation of salmonella species by other than serological methods is followed by a demonstration of the use of cysteine hydrochloride gelatin as a differential medium and of the effect of varying the proportions of the constituents of the medium, the pH, the temperature of incubation and the type and size of container as well as the amount of medium used.

Eighty-nine out of 91 strains of *S. gallinarum* produced a characteristic yellowish-white or grayish turbidity when incubated at 37°C. for 72 hours in a gelatin medium containing 0·15% cysteine hydrochloride. 454 strains of *S. pullorum* and various other *Salmonella* species produced no visible change in the medium beyond a surface pellicle, although several species, the majority of which gave negative results, were irregular in their reactions. Four strains of *Pseudomonas aeruginosa* and five strains of *Proteus vulgaris* gave reactions resembling those produced by *S. gallinarum.* Of the 20 *Salmonella* species studied, two strains of *S. paratyphi* A most nearly approched the reaction given by *S. gallinarum.*

Sodium potassium tartrate agar is recommended as a valuable supplementary medium for use with cysteine gelatin, since *S. gallinarum* consistently fermented it while *S. pullorum* produced no change.

These results are regarded by H. as additional evidence for the recognition of *S. pullorum* and *S. gallinarum* as distinct species.—R. O. MUIR.

MOSS, E. S., & BATTLE, J. D., Jr. (1941). **Human Infection with Pasteurella pseudotuberculosis rodentium of Pfeiffer. Report of Case.**—*Amer. J. clin. Path.* **11.** 677–699. [Abst. from authors' summary].

This is believed to be the sixth case of human infection by *P. pseudotuberculosis rodentium.* The clinical history, P.M. findings, and animal studies are recorded in detail.

*BARTH, G., KABELITZ, & STELLER, K. (1940). Untersuchungen über das Fleisch klinisch gesunder, mit chronischer Bruzellose behafteter Rinder. **[Tests on the Flesh of Normal Cows and of those Infected with Brucella].**—*Ernährung.* **5.** 501–506. [Translation of abst. in *Tierärztl. Rdsch.* **46.** 506].

On account of the frequent occurrence of contagious abortion in cattle, an examination was made of the chemical and physical properties of the flesh of seven chronically infected cows. No differences were found in the nitrogen, water, and ash contents, nor in digestibility, of the infected and normal animals.—E. C. H.

TOMKINS, L. J. (1940). **The Experience of Nearly Six Years with Calfhood Vaccination.**—*Cornell Vet.* **30.** 178–192.

T. outlines several years' experience of calfhood vaccination, giving statistical tables. He concludes that vaccination with strain 19 at the proper age seems to reduce susceptibility. All individuals show a pronounced agglutination response after vaccination and the time required to return to a negative blood status varies widely. A few individuals carry a high titre without any recession at least through their first lactation period.—S. J. GILBERT.

STONE, W. S. (1941). **Brucellosis in Horses and Goats.**—*J. Amer. vet. med. Ass.* **99.** 118–120.

In New York City, 1,169 horses were tested. 60% were negative in a dilution of 1 : 25 and 10% were positive in a dilution of 1 : 50 or higher. Five reacted in a dilution of 1 : 200 and only two reacted at 1 : 400. 270 serum samples from horses in rural dairying districts were tested. Not quite half were negative in all dilutions and very few high titres were obtained. Positive reactions were more common in horses on brucella-infected farms. Of 112 horses with fistulous withers or "poll evil", 80% showed some reaction to the agglutination test, and *Br. abortus* was isolated from 11 out of 18 cases of "poll evil" or fistulous withers. In testing equine sera, negative prozones occurred and on several occasions extended to a dilution of 1 : 200.

Random blood samples taken from 419 goats were tested and 94·5% were negative; 20 reacted at 1 : 50 but there were no reactions at 1 : 100. Cultures and g. pig inoculations made from the milk or carcasses of reacting goats did not reveal the presence of brucella.—S. J. G.

*Tuci, P. (1939). Ancora un agente di transmissione dell' infezione brucellare finora sconosciuto. [**Dromedaries as Carriers of Brucella Infection**].—*P.V. Soc. tosc. Sci. nat.* **47.** No. 4. [Abst. from abst. in *Nuova Vet.* **17.** 95–96].

Abortion was fairly common in a herd of Arabian dromedaries and there were deaths among the young stock during the first few days of life. Agglutination tests which were carried out for both *Br. abortus* and *Br. melitensis* yielded positive aggln. reactions in 42·3% of the herd, some at quite high titres.

An attendant who had assisted a dromedary at parturition later developed undulant fever.
—Miller Watson.

Metzger, H. J., & Stokes, F. R. (1941). **Results Obtained by Long-Continued Cultivation of Brucella Abortus in Living Chick Embryos.**—*Amer. J. vet. Res.* **2.** 178–180.

A virulent strain of *Br. abortus*, "C.G.", was passaged repeatedly through living chick embryos and any modifications in its characteristics were searched for in chosen transfers. The original strain, maintained by monthly subculture on potato agar, was smooth, carbon-dioxide sensitive, and produced macroscopic lesions including joint lameness in the g. pig. Carbon dioxide was found to be unnecessary for the growth of cultures prepared from the 39th and subsequent transfers. When inoculated intraperitoneally into the g. pig, the 27th transfer appeared of similar virulence to the original, but the 48th transfer produced no lesions even after passage. When antigenic power of the 50th transfer was compared with that of the original, it was shown that the latter provoked a higher agglutinating titre. This transfer also failed in pathogenicity tests to produce macroscopic lesions or joint lameness. No R strains were observed and antigenic suspensions prepared from the modified strains showed no difference in sensitivity from the original.—K. C. Sellers.

Mohler, J. R. (1941). **The Conquest of Brucellosis in Animals and its Relation to Human Health.**—*J. Amer. vet. med. Ass.* **99.** 263–271.

M. reviews the history of brucellosis in the U.S.A. leading to the use of strain 19 in calfhood vaccination. Blood testing and segregation has had considerable success but is rather expensive when indemnity is paid year by year; this method has been continued and is still in operation. "Problem herds" occur in which brucellosis still persists in spite of close supervision and periodic testing. In these herds calfhood vaccination should be of great value and a powerful supplement to the "test and slaughter" policy. Of 17,000 calves vaccinated with strain 19, 96% have had normal pregnancies and only a small percentage of those that aborted showed brucella infection.
—S. J. Gilbert.

Wise, N. B., & Poston, M. A. (1940). **The Coexistence of Brucella Infection and Hodgkin's Disease.**—*J. Amer. med. Ass.* **115.** 1976–1984.

The coexistence of brucellosis and Hodgkin's disease in man was demonstrated in 14 consecutive cases by the isolation of *Br. melitensis* from blood or lymph cultures. Brucella were only once isolated from blood or lymph node cultures from a much larger group of cases with diseases, other than Hodgkin's disease, which involve the lymph nodes. Although the data in this study do not establish an aetiologic relationship of brucella to Hodgkin's disease, it is suggested that the clinical course of Hodgkin's disease may be significantly influenced by brucella infection.

Tunnicliff, E. A. (1941). **A Study of Actinobacillus lignieresi from Sheep Affected**

with Actinobacillosis.—*J. infect. Dis.* **69.** 52–58.

T. compared strains of *A. lignieresi* isolated from two outbreaks of actinobacillosis of sheep described by MARSH and WILKINS [*V. B.* **10.** 83.] with several strains of bovine origin. No special differences were noted. Serologically, many strains appeared to be either inactive or to have a very simple antigenic structure. Hence it is stressed that strains which are not agglutinated by known type sera should not be judged too hastily. The agglutination test was of no value in differentiating healthy from affected sheep. In the diagnosis of the disease, the most valuable feature was the demonstration of spherical and crescent-shaped "rosettes" in histological sections of the abscessed areas.

T. considers that the organism known as *Bacterium purifaciens* which has been isolated in Europe by several workers from sheep having pyaemic infections of the head, is in fact *A. lignieresi*, since the two organisms correspond in all essential particulars. [The same conclusion has been reached by WRAMBY in Sweden—see *V. B.* **12.** 78.]—J. S. PATERSON.

I. TURNER, A. W., & EALES, C. E. (1941). **An Aerobic, Sporulating Bacillus that Forms Rotating and Migrating Colonies.** —*Aust. J. exp. Biol. med. Sci.* **19.** 161–166.

II. TURNER, A. W., & EALES, C. E. (1941). **Motile Daughter Colonies in the** *Cl. oedematiens* **Group and some other Clostridia** (*Cl. botulinum* C, *Cl. tetani*, *Cl. septicum*).—*Aust. J. exp. Biol. med. Sci.* **19.** 167–174.

I. The migration of bacterial colonies over the surface of agar medium was first described in 1904, but attracted little attention and was rediscovered in 1935. The authors describe a bacterium which they found as a laboratory contaminant and which exhibited two types of co-ordinated motility, *viz*, rotation and migration of colonies. Rotation may be clockwise or anticlockwise and may occur very early during growth, even after 4–5 hours at 37°C. Later the colonies may begin to migrate. As they do so they leave a peculiar track. Some cells are left behind, mainly at the edges of the track forming two parallel lines. Colonies usually pursue curved or spiral paths which may be as long as 2–3 cm. Swarming seldom occurs on 2% agar. Sodium luminal in 0·25% concentration prevents migration. The organism is related to *Bacillus circulans*.

II. The authors report for the first time colony migration in several species of clostridia. It has only been observed, however, in relatively small cell groups, 0·1–0·3 mm. in diameter, which detach themselves from the mother colonies or from the edge of a swarm film and wander away on more or less spiral paths. Thirty-six strains of *Cl. oedematiens* of various types were studied and the phenomenon was observed in 24. Some 65 strains of other motile clostridia were examined and some strains of *Cl. botulinum* C, *Cl. tetani*, and *Cl. septicum* exhibited colony motility. Impression preparations show that the migrating colony usually consists of cells much longer than those in the main colony and aligned in the direction of colony movement. In swarming, these bacteria form enormous filaments often arranged in great fusiform tresses which may coil up to form annular satellite colonies. The phenomena described in these two papers are well illustrated by numerous photographs.

—W. I. B. BEVERIDGE.

PALLASKE, G. (1939). Mukormykose beim Schwein. [**Mucor Mycosis in Pigs**].—*Tierärztl. Rdsch.* **45.** 601–603.

Mucor infection is not frequently reported in animals [see *V. B.* **7.** 323]. P. describes *Mucor* infection in a pig at an abattoir. There were two large "tumours" in the abdomen attached to the mesentery and a large "tumour" involving one lobe of a lung, together with numerous small nodules in the lung. The histology of the lesions is described and it is suggested that *Mucor* mycosis can be regarded as a type of infective granuloma bearing some resemblance to TB. The origin of the infection was unknown but on a basis of comparison with previously described cases it is considered that the abdominal lesions were primary and that other lesions were metastatic.—H. E. H.

BEEUWKES, H. (1940). Over pleurapneumonieachtige microorganismen, geisoleerd bij de spontane rattenpolyarthritis en bij een analoog ziektebeeld, ontstaan na enting van menschelijk materiaal bij de rat. [**Organisms Associated with Pleuro-Pneumonia ; Rodent and Human Material Compared**].—*Geneesk. Tijdschr. Ned.-Ind.* **80.** 1823–1834. [English summary copied *verbatim*].

Comparison of two strains of micro-organisms of the pleurapneumonia group. Strain "O" was isolated from spontaneous polyarthritis in a rat. Strain "Oey" was isolated from rats, which had been inoculated with material from a patient with acute rheumatic fever. Both strains were identical in their morphological characteristics, filtrability, virulence, resistance against heat, and of oxygen and stability at 4° and 37° Celsius. Identical lesions were produced in white mice.

The pathological anatomy of the lesions caused by the strains "O" and "Oey" did not reveal differences.

DISEASES CAUSED BY PROTOZOAN PARASITES

STARKOFF, O. (1939). Alterazioni del sangue e degli organi emopoietici nella tripanosomiasi sperimentale. **[Changes in the Blood and Haemopoietic Organs in Experimental Trypanosomiasis].**—*IV Congr. int. Pat. comp., 1939.* **2.** 263–264. [In Italian].

Observations made on *T. brucei* infections of experimental animals show that in addition to manifestations of anaemia, there is leucocytosis and the appearance in the blood of immature white cells, haemocytoblasts, endothelial cells, and histiocytes which may contain more or less well preserved trypanosomes in their cytoplasm. The bone marrow shows evidence of hyperplasia and intense erythroblastosis. In the chronic form there is hyperplasia of histioid cells with macrophage functions, and a tendency to fibrosis with atrophy of the marrow parenchyma.

The spleen is always enlarged, and in addition to an increase in the macrophages and plasma cells, three types of change may occur. In acute trypanosomiasis the prominent change is hyperplasia of the spleen follicles, whilst in less acute infections there is congestion of the parenchyma with myeloid metaplasia. In chronic trypanosomiasis fibrotic changes occur, with proliferation of the reticulum cells which in the follicles occur round the arterioles, thus producing a periarteriolar fibro-adenitis. There is also a considerable deposition of haemosiderin in the endothelial and macrophage cells.

Alterations in the lymph nodes are not as great as those in the spleen and bone marrow, nor do these lymph nodes contain as many trypanosomes as the other blood-forming organs. It is suggested that, for diagnostic purposes, examination of bone-marrow might be more satisfactory than examination of lymph-node juice.—U. F. RICHARDSON.

WOOD, F. D., & WOOD, S. F. (1941). **Present Knowledge of the Distribution of *Trypanosoma cruzi* in the Reservoir Animals and Vectors.**—*Amer. J. trop. Med.* **21.** 335–345.

Records are given of the occurrence of *T. cruzi* in vectors and reservoir animals in South and Central America, and in the U.S.A., and the occurrence is referred to of a similar trypanosome in monkeys in Java, in bats in Europe, and in bugs in Mauritius. There is some doubt about the identity of the bat trypanosome as it is highly specific to bats, but its relationship to *T. cruzi* is indicated by its ability to infest reduviid bugs.

The vectors of *T. cruzi* are various species of reduviid bugs belonging to the genera *Triatoma*, *Rhodnius*, *Eutriatoma*, and *Panstrongylus*, whilst amongst a variety of animal reservoirs the following appear to be the most important as a source of human infection:– cat, dog, armadillo, opossum, squirrel, fox, monkey, wood rat, and possibly bat.—U. F. RICHARDSON.

HOPPER, E. G. (1941). **Bovine Trichomoniasis with Particular Reference to its Diagnosis and Control.**—*Lederle vet. Bull.* **10.** 109–111.

H. describes the distribution of this disease of cattle in the U.S.A. Virgin heifers bred to virgin bulls have sometimes been found to be infected although the bulls remained free from infection. The exact mode of spread therefore remains partially unexplained, but it is suggested that faecal contamination of the vulva may account for such cases. Recently *Trichomonas bovis* has been found in visceral organs and in the heart blood.

Among the usual clinical signs in cattle, H. mentions a characteristic granulation ("nutmeg-grater feeling") of the anterior vaginal wall, which he claims is positive evidence of the disease. Treatment and control are discussed. [From his description of the state of the uterus 3–5 months after conception it appears that a somewhat later abortion is expected in the U.S.A. than is the case in Great Britain (from two months onwards).]—C. V. WATKINS.

HINSHAW, W. R., & MCNEIL, E. (1941). **Infectious Catarrhal Enteritis of Turkeys. Transmission and Prevention.** pp. 2. Davis, Calif.: Division of Veterinary Science, University of California.

This disease should not be termed trichomoniasis, since the two species of *Trichomonas* found in the lower intestinal tract of turkeys are not pathogenic. The causative agent is *Hexamita meleagridis* which occurs in the small intestine, whose walls lose tone and frequently become thin with bulbous areas. The most susceptible age is 1–9 weeks, but if there are complicating factors such as pullorum disease, susceptibility may extend to 16 weeks. Many surviving birds carry parasites in the intestine and bursa of Fabricius, so that there may be a gradual build-up of infection. Recommendations as to treatment and control include quarantine and segregation of different age groups, warmth, and daily dry cleaning of houses. The importance of accurate diagnosis by laboratory methods is emphasized.

—C. HORTON SMITH.

REYER, W. (1941). Zur Klärung der Resistenzerschein bei den Darmcoccidiosen der Warmblüter. **[The Nature of Resistance to Coccidiosis in Warm-Blooded Animals].**—*Zbl. Bakt. I. (Orig.).* **146.** 305–310.

Resistance and immunity are usually dependent on the number of susceptible and of immune cells in the tissues, and also upon the size of infection produced by the number of productive oocysts fed, the rate of development of the schizonts and the number of schizont generations, and the number of merozoites resulting from each schizont. Resistance and immunity would seem to depend entirely on the increase of cells following the infection of new tissue.—C. HORTON SMITH.

BECKER, E. R., & DILWORTH, R. I. (1941). **Nature of Eimeria nieschulzi Growth-Promoting Potency of Feeding Stuffs. II. Vitamins B_1 and B_6.**—*J. infect. Dis.* **68.** 285–290.

If a basal ration, limited in vitamins B_1 and B_6, and to a lesser degree in nicotinic acid and riboflavin, is supplemented with vitamin B_1 a condition is created which significantly reduces the number of oocysts of *E. nieschulzi* in infected rats. If the ration is supplemented by vitamin B_6, increase in oocyst numbers is observed. On the other hand, when the ration includes both vitamins the numbers of oocysts are more significantly reduced than when vitamin B_1 alone is included. B_1 and B_6 occur widely in foodstuffs and may, either separately or together, influence coccidial infection in rats feeding on such foodstuffs. The length of time the rats were on the basal diet is stated to be short for the manifestation of any drastic effects produced by the diet.—C. H. S.

BECKER, E. R. (1941). **Effect of Parenteral Administration of Vitamin B_1 and Vitamin B_6 on a Coccidium Infection.** —*Proc. Soc. exp. Biol., N.Y.* **46.** 494–495.

In a continuation of the work reported in the preceding abstract, vitamins B_1 and B_6 were injected intraperitoneally into rats instead of being mixed with the ration, in order to determine whether the synergistic action of the vitamins was dependent on their administration to the site of infection through the intestinal route. The results were similar to those obtained previously, showing that vitamins B_1 and B_6 have an equally inhibiting influence on the development of *E. nieschulzi* infection in rats when administered parenterally as when fed in the ration.—R. ALLCROFT.

HEWITT, R. (1941). **The Distribution of Avian Malaria Parasites (P. relictum and P. cathemerium) in Visceral Organs as Compared with the Peripheral Blood.** —*Amer. J. Hyg.* Sect. C. **33.** 54–68.

Interest in the unequal distribution of human and avian plasmodia in the body of the host has led to the present investigation. H. studied the problem of distribution in birds infected with *P. relictum* and *P. cathemerium* and found that smear preparations revealed heavier parasitism or more different stages of the parasite in the spleen, liver, and bone-marrow than the peripheral blood. A bone-marrow smear taken from a common house-finch showed many more segmenting stages of *P. relictum* than the blood, spleen, or liver. Results of infection experiments, however, made it clear that no host organ or tissue can be regularly predicted to show greater numbers of parasites than occur in any other part of the body at the same time. H. suggests that this is probably due to the combined effects of a diversity of influences on the part of both parasite and host, such as

(1) mechanical blockage produced by stimulation of the haemopoietic system and the proliferation of phagocytes; (2) physiological and chemical tropisms, such as the presence of glucose and increased oxygen concentration in different tissues; (3) structural differences in tissues or organs brought about by structural variations of blood vessels, and (4) blockage by the production of emboli or infarction.

—C. HORTON SMITH.

TERSKIKH, V. I. (1940). **The Aetiology of Infectious Icterus among the Cattle.**—*J. Microbiol., Moscou.* No. 8. pp. 66–68. [In Russian: English summary]. [Presumably identical article appeared in *Sovyet. Vet.* No. 6. pp. 21–22. (1940)]. [Abst. in *Bull. Hyg., Lond.* **16.** 335, copied *verbatim.* Signed: H. H. S.]

The author investigated, in 1938, cases of leptospirosis in man in the U.S.S.R. and isolated a leptospira. In the same district infectious jaundice had been and was occurring among the cattle, but the causative organism of the latter could not be isolated. Examination of 147 cattle sera, however, for agglutinins against the human organism gave positive results in all but seven. Early in the following year he succeeded in isolating the same variety of leptospira from the blood of calves in the incubation period of the disease. He has named it *L. vitulina s. bovina.* [The summary does not indicate whether tests have been made to identify this with any other of the known types].

LARSON, C. L. (1941). **A Protection Test in Mice for Identification of Leptospirosis Icterohaemorrhagica (Weil's Disease).**—*Publ. Hlth Rep., Wash.* **56.** 1593–1609. [Author's conclusions copied *verbatim*].

1. Serums from 25 humans, 13 wild rats, and 1 dog all suffering from leptospirosis were tested for the presence of specific protective antibodies against *L. icterohaemorrhagiae.* Material from three rabbits hyperimmunized against *L. icterohaemorrhagiae* was also tested. 2. Protective antibodies were detected in all of the above serums. 3. No protective antibodies against leptospirae were produced following influenza, malaria, poliomyelitis, Rocky Mountain spotted fever, typhus fever, infectious jaundice, syphilis, and yellow fever. 4. Indefinite results were obtained with serums derived from rabbits hyperimmunized against *L. canicola.* 5. Protective antibodies develop during the second week of the disease and persist for at least five years. 6. The protective antibody titer roughly follows the agglutinin titer. 7. The mouse protection test devised can be used for the diagnosis of [human] leptospirosis and offers a specific and easily interpreted test for this purpose.

—. (1941). **Leptospirosis and its Diagnosis with the New *Lederle* Antigen.**—*Lederle vet. Bull.* **10.** 102–103.

An account of the well known conditions due to leptospira and of an antigen issued by the Lederle laboratories for the slide agglutination test with serum from the suspected individual.

—C. V. WATKINS.

JURADO, F. R. (1941). La espiroquetosis aviar. Su primer estudio clínico y experimental en el país. [**Avian Spirochaetosis**].—*Rev. Med. vet., B. Aires.* **23.** 183–207.

J. reviews present knowledge of the subject and reports cases of *Borrelia* [= *Spirochaeta*] *gallinarum* infection of fowls in Buenos Aires. The disease was transmitted experimentally to hens, but no new knowledge is contributed regarding symptoms or lesions. Artificial infection of pigeons was successful but failed in the case of rabbits.—MILLER WATSON.

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

*STENIUS, R. (1940). Talven 1939–40 suu- ja sorkkatautiepizootia. [**Foot and Mouth Disease in Finland in 1939-40**]. —*Suom. Eläinlääkaril.* p. 98. [Abst. from abst. in *Skand. VetTidskr.* **31.** 32].

S. describes the outbreak of F. & M. disease in Finland which was introduced from Russia at the outbreak of the Russo-Finnish War on November 30th, 1939. The epidemic, which reached its maximum by January 31st, 1940, when 2,775 herds were infected, declined steadily until April and thereafter more rapidly so that on July 31st, 1940 only 13 farms were

involved. The disease then subsided entirely. The disease was mild in character and the virus was of the " O " type.—G. B. Brook.

de Boer, E. (1941). Onderzoekingen over mond- en klauwzeer. Type-differentiatie van her hier te lande voorkomende virus. [**Research on Foot and Mouth Disease. Type Differentiation of Virus in the Dutch East Indies**].—*Ned.-ind. Bl. Diergeneesk.* **53.** 127–141. [English summary].

The author describes F. & M. disease in the Dutch East Indies, where it occurs particularly in Java and Madura. A graph shows (1) the connexion existing between the appearance of the disease in Java and Madura and in other parts, and (2) the enzootic form of the infection from 1906–1925, and 1930–39, and the epizootic form during the years 1926 and 1929. By type determination tests on six local strains adapted to g. pigs, the D.E.I. virus was found to be type A.—L. Tobback.

Mohler, J. R. (1941). **Infectious Equine Encephalomyelitis in the United States in 1940.**—*J. Amer. vet. med. Ass.* **98.** 381–383.

A duplicate of an article already abstracted [*V. B.* **11.** 683].

Syverton, J. T., & Berry, G. P. (1941). **The Transmission of Equine Encephalomyelitis to the Western Burrowing Owl,** *Speotyto cunicularia hypogaea* **(Bonaparte).**—*Amer. J. Hyg.* Sect. B. **33.** 37–41.

The authors successfully infected 12 western burrowing owls with E.E., 11 with the Western type and one with the Eastern type. Five successive owl passages with the Western type were effected, the virus being introduced intracerebrally in seven cases (six died within five days and one after 26 days), intracutaneously in two cases (one died within five days and one survived), and subcutaneously in one case which survived. The one bird given the Eastern type intracerebrally died after 72 hours. The birds were not tested for natural antibody reactions before the inoculations.

Sellards, A. W., Tyzzer, E. E., & Bennett, B. L. (1941). **The Infection of Birds with the Virus of Equine Encephalomyelitis.**—*Amer. J. Hyg.* Sect. B. **33.** 63–68.

A strain of E.E. virus was isolated from an outbreak in pheasants and maintained in the laboratory for a year by mouse passage ; it was proved by cross-neutralization tests to be of the Eastern type and immunologically indistinguishable from a strain obtained from horses. It produced paralysis and death in pheasants when injected intramuscularly, and death in chicks a few days old when injected intracerebrally or subcutaneously. Hens about four months old, however, resisted the virus when it was injected intramuscularly or intracerebrally and remained healthy, although their serum protected mice against the virus. In view of the evidence in the literature of the resistance of young chicks to E.E., the authors suggest that the pheasant strain may have been particularly virulent for the chick.

Howitt, B. F. (1940). **Comparative Susceptibility of Wild and Domestic Birds and Animals to the Western Virus of Equine Encephalomyelitis (Br. Strain) in California.**—*J. infect. Dis.* **67.** 177–187. [Author's summary copied *verbatim*].

No virus was isolated from the brains of 48 wild animals and birds representing 14 different species.

Gambel (Zonotrichia leucophrys gambeli) and English sparrows (Passer domesticus), quail (Lophotryx californica subsp.), juncos (Junco oreganus subsp.) and thrashers (Toxostoma lecontei lecontei) were all susceptible to intracerebral inoculation of the Br. strain of equine virus, even to a dilution of 10^{-6} for the first 3 species.

The Richardson squirrel (Citellus richardsonii subsp.) cotton (Sigmodon hispidus texianus and eremicus) and kangaroo rats (Dipodomys heermanni subsp.) and six species of wild mice (Rheithrodontomys megalatus, Microtus montanus, Microtus californicus, Microtus mordax, Peromyscus maniculatus) succumbed to 10^{-6} and 10^{-7} dilutions, respectively. Wood-rats (Neotoma fuscipes), puppies and 2 species of wild rabbits (Sylvilagus bachmani subsp. and Syl. audubonii) were also susceptible.

Domestic fowl varied in their reactions to the virus, ducks and young turkeys usually succumbing to 10^{-4} dilution, pigeons and young chicks to 10^{-6} or 10^{-7}, respectively. Leghorn pullets and old hens were the most resistant of all barnyard fowl tested, the resistance varying more with the age than the locality or the presence of neutralizing antibodies.

Frogs were unaffected by the virus.

All birds resisting one intracerebral inoculation, even of highly dilute virus, were immune to a second stronger dose and most of them developed neutralizing antibodies in 5 to 7 days, which if weak were enhanced after the second injection.

Virus could be recovered irregularly from the blood of inoculated fowl, even though they failed to show clinical symptoms of the disease.

Neutralizing antibodies may appear in the serum of resistant fowl very soon after inoculation of virus and may also be present at time of or before death.

ADLER, A. (1941). **Equine Encephalomyelitis in Man.**—*Amer. J. Path.* **17.** 407–410. [Author's summary copied *verbatim*].

A case is reported with a clinical, serologic and pathologic picture which could not be differentiated from that of equine encephalomyelitis in man. No attempt to isolate the virus of equine encephalomyelitis was made. Therefore, a definite differential diagnosis between sporadic equine encephalomyelitis and post-infectious encephalitis cannot be made, though the observations favor the former diagnosis.

BEARD, D., FINKELSTEIN, H., & BEARD, J. W. (1940). **Repeated Vaccination of Man against the Virus of Equine Encephalomyelitis.**—*J. Immunol.* **40.** 497–507.

The antibody reaction resulting from vaccination against Eastern type E.E. was found to have completely disappeared after 6–9 months, and to have commenced to decrease after two weeks; antibodies for the Western type, however, were in general maintained at a relatively high level for the same period. The authors consider revaccination within one year to be advisable under conditions of continued exposure to the virus, although, owing to the stronger reaction which they observed as a result of the revaccination, the interval between the second and subsequent vaccinations may be much longer than between the first and second.

I. WYNNS. (1940). **Human Cases of Equine Encephalomyelitis.**—*Proc. 11th ann. Conf. Calif. Mosq. Contr. Ass., 1940.* pp. 4–6. Berkeley, Calif.

II. DUCKWORTH, C. U. (1940). **Infectious Equine Encephalomyelitis.**—*Ibid.* pp. 6–8.

III. AITKEN, T. H. C. (1940). **The Relationship of the Distribution of Cases of Equine Encephalomyelitis (Human and Equine) and Mosquitoes in California.**—*Ibid.* pp. 8–15.

IV. BUSS, W. C. (1940). **Equine Encephalomyelitis in Kern County.**—*Ibid.* pp. 15–23.

V. MERRIL, M. H. (1940). **The Mosquito as a Possible Vector of Equine Encephalomyelitis.**—*Ibid.* pp. 23–31.

VI. —. (1940). **[Discussion on Foregoing Papers].**—*Ibid.* pp. 31–34.

A symposium on equine encephalomyelitis presented to the annual conference of the California Mosquito Control Association.

I. During 1940, 220 human cases of E.E. were reported in California, with a 20% mortality; 34% of the cases occurred in children under four years of age. The total number of cases in animals is not stated, but the figure is given as 419 up to the end of September. These figures are compared with the situation in 1930 and 1931, when there were thousands of cases in horses and no human cases were reported. Charts are given of the relative incidence of the disease in animals and man; the peak date for horses was the beginning of July, while the peak for human beings was four weeks later. Almost all the human cases were reported from rural districts.

II. A short description of the disease as it occurs in horses, together with figures for its incidence in California. There was a great increase in 1940, the number of cases being nearly twice that reported for 1939; the figure is given as 732, with 242 deaths. 13,218 animals were vaccinated during the year, of which 65 later developed the disease. [The figures for the incidence in horses given in I and II do not agree.]

III. A summary of the position regarding the mosquito transmission of encephalomyelitis, together with a list of the most probable vectors of the disease in California. These are given as *Aëdes taeniorhynchus*, *A. squamigor*, *A. dorsalis*, *A. nigromaculis*, *A. vexans*, and *A. varipalpus*; the breeding habits and incidence of each species in California are given.

IV. An account of the occurrence of E.E. in human beings in Kern County, California,

during the years 1938–40. A detailed description of four cases is given.

V. A summary of M.'s own work on the mosquito transmission of E.E., most of which has previously been published elsewhere.

VI. The importance of mosquito control in the eradication of E.E. was emphasized and some details of the expansion of this control in California were given.

POPPE, K. (1939). Neue Erkenntnisse hinsichtlich der Uebertragung neurotroper Viruskrankheiten des Menschen und der Tiere. **[Transmission of Neurotropic Virus Diseases in Human Beings and Animals]**.—*IV Congr. int. Pat. comp., 1939.* **2.** 99–107.

The pathology of those diseases of domestic animals and man caused by neurotropic viruses is briefly surveyed, and their transmissibility between domestic animals and man is discussed.—H. H. SKINNER.

BLACK, C. E. (1940). **Interpretations of Neurotropic Virus Cell Inclusions, with Special Reference to the Negri Body.**—*J. infect. Dis.* **67.** 42–47. [Author's summary copied *verbatim*].

The small Negri body containing a single internal basophilic granule, the intranuclear inclusion of poliomyelitis and the nucleoli of certain neuroglia cells particularly in small animals are identical in size, shape, contour, staining reaction and granular content.

Nucleoli of certain neuroglia cells are frequently confused with small Negri bodies, particularly in smear preparations.

Evidence indicated that many so-called virus inclusions are actually metabolic responses of the nucleus and are not degenerative products of the cell.

The special staining methods do not show that the Negri body is a degenerative product of the cell.

KANTSCHEFF, S. (1941). Klinische Beobachtungen über die Influenza der Pferde. **[Clinical Observations on Equine Influenza]**.—*Tierärztl. Rdsch.* **47.** 418–421 and 427–431.

K. studied the course of influenza in 31 horses at Berlin veterinary school, 17 being cases of simple uncomplicated influenza and the rest sustaining complications before recovery, such as concurrent strangles or bronchopneumonia.

The well known syndrome is described and illustrated by temperature charts, which show the characteristic diurnal variations.

The blood picture of 23 cases was studied throughout the illness. In uncomplicated cases there was no leucocytosis but merely an increase in the proportion of neutrophile leucocytes with segmented nuclei and a corresponding decline of lymphocytes, with a rapid return to normal as the symptoms subsided. There was also an increase in red blood corpuscle sedimentation rate during the illness. Complicated cases showed various blood changes including leucocytosis.

Treatment with prontosil or prontalbin had no influence on the course of the disease, except that it seemed to protect against the occurrence of complications. Heart tonics were useful.

—J. E.

SCOTT, J. P. (1941). **Studies on Swine Influenza Virus.**—*Vet. Ext. Quart. Univ. Pa.* **41.** No. 34. 3–21.

Two types of swine influenza are recognized by S. The first is the classical mild type caused by the combined action of the swine influenza virus and *Haemophilus influenzae suis*, while the second, which S. calls "stockyard or exposure swine influenza" is more violent, catarrhal pneumonia and fibrinous pleurisy being observed P.M. From the latter type and also from one ordinary outbreak of swine influenza, *Pasteurella suiseptica* was isolated in addition to the virus.

In experiments carried out by S., the combined action of *H. influenzae suis* and the swine influenza virus produced a contagious disease whereas a non-contagious form followed the intranasal instillation of *Past. suiseptica* and virus. Cultures of *Past. suiseptica* were non-pathogenic.

The virus was cultivated successfully in the developing egg and a technique was developed whereby, by calculating the loss of weight of the egg during virus-antiserum neutralization tests, it could be determined whether or not the virus was growing, without biological tests in mice or pigs being resorted to.

Attempts to immunize pigs against virus infection with either the virus itself from the lungs of affected pigs, avirulent egg-passage virus, or chemically treated virulent virus, were not very successful. Greatest resistance followed the simultaneous inoculation of avirulent egg-passage virus and formolized

vaccines of *H. influenzae suis* or *Past. suiseptica*.

Hyperimmune swine influenza serum did not materially affect the course of the disease in mice.—J. S. PATERSON.

RIDALA, V. (1939). Täiendavaid katseid sigade influentsa ravi alal. [**Further Experiments on the Control of Swine Influenza**].—*Eesti loomaarstl. Ring.* **15.** 1–10. [Abst, from English summary].

A vaccine prepared from 12 strains of *Haemophilus influenzae suis* was tested on 39 piglets. Ten subcutaneous injections were given to each animal, a dose of 2–4 ml. being given every 4–8 days and each one receiving a total of 27 ml. of vaccine. The first dose was given when the piglets were 1–4 days old and the last dose when they were about eight weeks old. They were then exposed to permanent contact with infected pigs, and remained healthy. When the piglets were slaughtered at the age of 6–7 months, no changes were observed in the lungs of 35, while *H. influenzae suis* could not be isolated from the other four.

On the same farm, 31 piglets 7–8 weeks old were bought in from farms free of swine influenza. Several of them became infected and a positive culture was obtained from the lungs of 13.

DREGUSS, M., & HOFFMANN, F. (1941). Hyperimmunisierung der Schweine mit menschlichem Influenzavirus. (Vorläufige Mitteilung). [**Hyperimmunization of Swine with Human Influenza Virus**].—*Zbl. Bakt. I.* (*Orig.*). **146.** 310–312.

A preliminary report of the preparation of immune serum of high titre in swine infected intranasally, intratracheally, or intraperitoneally with human influenza virus strains. The virus-neutralizing potency of such antisera was superior to that of antisera prepared in ferrets or horses. Future work will be devoted to the possibilities of practical application of porcine antiserum.—J. E.

I. ANDREWES, C. H., GLOVER, R. E., LUSH, D., HUDSON, N. P., & STUART-HARRIS, C. M. (1941). **Influenza in England in 1940-41.**—*Lancet.* **241.** 387–389.

II. HARE, R. (1941). **Active Immunity to Influenza Virus in the Mouse.**—*J. Immunol.* **40.** 267–279.

III. TAYLOR, R. M. (1941). **Reactivation of Neutralized Influenza A Virus by Dilution.**—*Ibid.* 373–381.

IV. TAYLOR, R. M. (1941). **Passive Immunization against Experimental Infection of Mice with Influenza A Virus: Comparative Effect of Immune Serum Administered Intranasally and Intraabdominally.**—*Ibid.* **41.** 453–462.

V. EATON, M. D. (1941). **Strain-Specificity of Complement-Fixation with Sera of Mice Immune to the Virus of Influenza A and Swine Influenza.**—*Ibid.* 383–390.

I. Influenza A virus was not obtained in material from the human respiratory infections prevalent in England in the early months of 1940.

In January and February 1941 no widespread influenza epidemic occurred but it was shown that a considerable proportion of sporadic cases in those months was due to influenza A virus.

II. Two antigenically dissimilar strains of virus were used in this study. Mice were immunized by the intraperitoneal inoculation of clarified mouse-lung suspensions and it was found that a large dose of virus produced complete immunity against the heterologous strain. The dose could, however, be adjusted so that immunity was established against the homologous but not the heterologous strain. The importance of the dose factor in antigenic analysis by cross-immunity tests is stressed.

Crude, unfiltered suspensions of virus were inactivated for four days at 0°C. in the presence of 0·1% formalin. This only caused a slight reduction in antigenic value, although the virus was shown to be inactive. There was apparently no change in antigenic specificity. When clarified suspensions of virus, containing little extraneous protein, were formolized, there was a marked loss of antigenic power.

III. The experiments indicated that a large proportion, probably about 90%, of the virus is permanently neutralized by immune serum when mixed *in vitro*, but that dilution of inactive mixtures causes slight reactivation.

Under certain conditions virus could be demonstrated in dilute suspensions of lung tissue from convalescent mice although concentrated suspensions of the same lung tissue were inactive.

IV. The protective action of immune serum instilled intranasally was shown to persist for at least 48 hours when immunity was tested by the intranasal instillation of virus.

The same amount of immune serum given intra-abdominally was much less effective in preventing pulmonary infection.

The antibody content of lung tissue and of blood was ascertained following intranasal and intra-abdominal inoculation of immune serum and these results, together with the immunity tests, showed that the resistance of mice to infection corresponds to the amount of antibody in the lung tissue. Antibodies in the bloodstream were apparently much less effective in preventing infection.

V. Complement-fixation tests carried out with the sera of mice immunized against various porcine and human strains of influenza virus demonstrated strain specificity. The specificity was, however, less marked than that found by neutralization tests with the same sample of mouse serum.—JOHN FRANCIS.

SALK, J. E. (1941). **Partial Purification of the Virus of Epidemic Influenza by Adsorption on Calcium Phosphate.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 709–712.

The method consists of addition of phosphate buffer and calcium chloride to a suspension in normal saline of ground lung tissue of mice infected with the PR-8 strain of influenza virus; the optimum pH was 8–8·4. The precipitate formed adsorbs the virus which is eluted by dissolving the calcium phosphate in sodium citrate solution at approximately neutral pH. After dialysis of this citrate solution against distilled water, the dialysed solution was used as the partially purified preparation and tested for infectivity, immunizing potency and nitrogen content. The infective titre of the partially purified fraction compared favourably with the titre of the untreated suspension, and the amount of virus activity left in the supernatant fluid after adsorption was very little when compared with the original. The nitrogen content of the partially purified fraction was about 9% of the original, showing that it is possible to eliminate about 90% of the nitrogenous impurities with very little loss of the virus activity. Tests showed that the immunizing potency of the partially purified fraction paralleled the infective potency. It is pointed out that the degree of purification achieved by this chemical method is of the same order as that obtained with the ultracentrifuge in investigations on other viruses.—R. ALLCROFT.

RICKARD, E. R., HORSFALL, F. L., Jr., HIRST, G. K., & LENNETTE, E. H. (1941). **The Correlation between Neutralizing Antibodies in Serum against Influenza Viruses and Susceptibility to Influenza in Man.**—*Publ. Hlth Rep., Wash.* **56.** 1819–1834. [Authors' summary copied *verbatim*].

The level of neutralizing antibodies in the serum against the homologous virus is an important factor in determining susceptibility or resistance to influenza A and to influenza B in human beings. However, high antibody levels against influenza A virus do not diminish the frequency of influenza B nor do high antibody levels against influenza B reduce the incidence of influenza A. Influenza of unknown cause appears to occur with somewhat increased frequency among individuals who possess considerable concentrations of antibodies against both known influenza viruses.

*TSUBAKI, S. (1938). **Cultivation of Hog Cholera. Report I, Cultivation of the Organism in Hog Testicular Tissue in Tyrode Solution.**—*Saikingaku Zasshi.* No. 513. [Abst. from abst. in *Kitasato Arch. exp. Med.* **16.** No. 4. p. 1 of absts.]

20–30 pieces, 1–2 cm. in size, of testicular tissue from young pigs were placed in 4·5 ml. of Tyrode solution in a 5 ml. Erlenmeyer flask. 0·5 ml. of a Berkefeld filtrate of infected blood was centrifuged and the supernatant fluid added to the solution, and the flask was incubated at 37°C. for four days. The testicular tissue was then "emulsified" and, together with the solution, was cultured in fresh medium which contained pieces of testicular tissue. This was successfully repeated for five generations, 10 ml. of the tissue culture being infective for pigs.

CHAPIN, R. M., POWICK, W. C., MCBRYDE, C. N., & COLE, C. G. (1939). **The Influence of Hydrogen-Ion Concentration on the Survival of Hog-Cholera Virus in Defibrinated Blood.**—*J. Amer. vet. med. Ass.* **95.** 494–496.

Two samples of fresh virulent defibrinated swine fever blood, one containing 0·5% phenol solution and the other 40% glycerin, were divided into suitable smaller volumes which were adjusted to various pH values, within the range 3·6–9·0, by the addition of either sodium hydroxide or hydrochloric acid solu-

tions. The pH of each sample was determined two hours after preparation by reading after 5 min. on a standard glass-electrode electrometer and samples were stored in the dark at 25°C. Infectivity tests made in single pigs by an unstated route at rough intervals of five weeks, showed that the virus survived best at pH 4·8–5·1. Samples of virulent blood containing 40% glycerin were adjusted to values within the range of pH 4·58–5·72 by the addition of acetic acid solution and were stored at refrigerator temperature. The virus survived longest at pH 5·25 and deteriorated four times as rapidly at moderate room temperature as in the ice-chest. Virulent blood, containing 40% urea and adjusted to pH 6·0, remained infective for at least 22 days at room temperature and at least 31 days in the ice-chest. Virus survived for one week in glycerinated or phenolated virulent blood stored at 37·5°C. at its natural pH value and for two but not three weeks at its optimal pH value. Virulent defibrinated blood stored at pH 5·0 was found to be insufficiently fluid for use in the field.

R. O. Muir.

Molfino, F. (1939). Il meningo-tifo eruttivo sporadico benigno. (Malattia dei giovani porcai). [**Eruptive Meningo-Typhoid (Swineherds' Disease)**].—*Rass. med. Indust., Torino.* **10.** 452–457.

A brief discussion on the literature is given. It is suggested that rats or obligate parasites of pigs may act as intermediate hosts of the virus. No new material is presented.

Schwarte, L. H., & Biester, H. E. (1941). **Pox in Swine.**—*Amer. J. vet. Res.* **2.** 136–140.

In this outbreak unweaned pigs of 4–6 weeks were affected. Lesions were confined to the back and the sides where hyperaemia was followed by epithelial papules involving the stratum granulosum. Vacuolation followed, developing into a necrotic lesion resembling a fungal infection, but vesiculation and pustulation were not as well defined as in a typical vaccinia infection. Flies were associated with the spread of the disease; the pigs were free from the pig louse so it could not be incriminated.

The disease was experimentally transmitted to eight-week-old pigs, both filtered and unfiltered preparations from the naturally occurring lesions being used. While the experimental lesions on the back and sides resembled those of the natural cases, those on the belly passed through all the stages typical of a pox infection. By animal protection experiments the virus was proved to be immunologically distinct from vaccinia; in a discussion on nomenclature the authors suggest that the condition described should be known as swine pox.—K. C. Sellers.

Magnusson, H. (1940). Om elakartad katarralfeber. Några försök att experimentellt överföra sjukdomen. [**Experimental Transmission of Bovine Malignant Catarrh**].—*Beretn. 5. nord. Vet.-møde, Kbh., 1939.* pp. 369–391. Discussion pp. 391–409. [German summary].

M. carried out experiments to test the theory that B.M.C. is transmitted to cattle by sheep. He obtained five sheep which had been in contact with cattle on farms which had suffered great loss from the disease and brought them to Malmö where they were confined for one year in close contact with "some" young cattle from Malmöhus county where B.M.C. had never been observed. The animals were well fed and cared for and no case of the disease appeared. The experiment was regarded as negative and the sheep were sent away to a small farm in Malmöhus and kept under the same roof as eight cattle, though not in close contact with them. Feeding and hygienic conditions were not very good. Two years passed and then within five months four of the cattle died of B.M.C. The sheep were not sold as advised. Two years later B.M.C. appeared again, infecting a calf which was sent to Malmö where it died. Blood was taken from the calf three days before death and injected intravenously into a cow which developed B.M.C. 27 days later and died. The disease was passaged to another cow which showed symptoms after 50 days and also died.

The sheep were the only link between these Malmöhus cases and the original ones in Småland, so M. concluded that they had acted as a reservoir for the causal agent. The evidence of the passaged cases supports the findings of Goetze & Liess [*V. B.* **1.** 89.] on the infectivity of blood.

M. discusses the disease with reference to the work of others and to the possible co-identity of *snotziekte*. Authentic outbreaks have been recorded in which sheep have, and have not, been present, so that the sheep

vector theory does not hold good exclusively.

In the discussion JENSEN suggested a connexion between B.M.C. and myiasis by *Eristalis* larvae and PETERSEN suggested that insects may be concerned. HOLMBOE described B.M.C. in the Stavanger district of Norway and a winter diarrhoea known as *Fjosskjeda*, the cause of which has not been found in spite of bacteriological studies. BENDIXEN described a perennial outbreak of B.M.C., recurring in the spring of three successive years in Denmark. There were three sheep and one ram on the farm: they were removed to Copenhagen and placed in a box with four healthy young calves, one of which died of B.M.C. three months later. The other calves remained well until slaughter 11 months after contact with the sheep. Attempts to transmit the disease to a cow and to rabbits failed. BLYSTAD described B.M.C. in various parts of Norway and claimed good curative results with a guaiacol-benzoic acid prescription. WALL related his experience of the successful control of B.M.C. by the provision of concrete byre floors in place of soil and of a pure water supply after all affected animals had been slaughtered.—J. E.

KRANEVELD, F. C., & NASOETION, A. (1941). Het virus van de in Nederlandsch Indië voorkomende Pseudovogelpest (tweede mededeeling). **[The Virus of Newcastle Disease in the Dutch East Indies. II.]** —*Ned.-Ind. Bl. Diergeneesk.* **53.** 148–155. [English summary]. [For part I, see *V. B.* **10.** 256].

After referring to their previous experiments, the authors state that they were unable to infect white mice with any of 25 strains of Newcastle disease from various islands of the archipelago. The authors were unable to adapt the virus to white mice by serial intracerebral injections at intervals of 1–2 days.—L. TOBBACK.

PINKERTON, H., & SWANK, R. L. (1940). **Recovery of Virus Morphologically Identical with Psittacosis from Thiamin-Deficient Pigeons.**—*Proc. Soc. exp. Biol., N.Y.* **45.** 704–706.

A total of 400 young pigeons was subjected to vitamin B_1 deficiency as already described [see *V. B.* **11.** 54]. In some 20 birds which succumbed within ten days of the commencement of the experiment, a fibrinous peritonitis and pericarditis with or without an enlarged and haemorrhagic liver was observed. Cultures from organs or exudates were bacteriologically sterile, but filtrates prepared from the ground-up organs or exudates of four pigeons proved lethal to mice within 2–4 days of intracranial injection. Histological examination of the mouse brains revealed a marked choriomeningo-encephalitis, the inflammatory exudate of which was characterized by the presence of mononuclear cells containing intracellular bodies said to be identical with those of psittacosis. Similar bodies were found in cells of the exudate from two pigeons. Serological confirmation of the nature of the virus was not carried out, as it proved inactive after storage in glycerol.

The authors consider it highly probable that the birds were harbouring psittacosis virus, and that vitamin B_1 deficiency resulted in the production of an active infection.—A. N. WORDEN.

BURNET, F. M., & FOLEY, M. (1941). **Infections of the Respiratory Tract of Chick Embryos by the Viruses of Psittacosis and Infectious Laryngotracheitis. A Comparison with Influenza Virus Infections.**—*Aust. J. exp. Biol. med. Sci.* **19.** 235–240.

In a limited number of tests, infection was not set up in the respiratory tract of the chick by inoculation into the amniotic cavity with the following viruses:– vaccinia, herpes, fowl-pox, pigeon-pox, louping-ill, and Rous sarcoma. The viruses, however, of psittacosis and of infectious laryngotracheitis of fowls produced definite lesions.

Laryngotracheitis virus produced no macroscopic lesions in the lungs, but there was turbid fluid in the trachea and sometimes lesions could be detected in the larynx with a hand lens. On section, lesions were found in the lung of the same general character as in the natural disease in the adult fowl. The virus was present in the embryos in high concentration, *e.g.* 6×10^5 infective units per ml. Occasional embryos did not develop obvious lesions. The infection was kept going in series for as long as nine generations, but only by using selected embryos.

After inoculation with psittacosis virus the lungs appeared pale and microscopically there was found an infection of the superficial epithelial cells of the larger bronchial divisions. The virus was found present in the embryos in a titre as high as $1{\cdot}3 \times 10^7$. Neither of these two viruses has the power of spreading rapidly

through the respiratory system of the embryo as does influenza virus. From the practical viewpoint, amniotic inoculation offers no advantage over current methods of studying these viruses.—W. I. B. BEVERIDGE.

RAVAGLIA, F. (1939). Su alcuni focolai di laringo-tracheite infettiva dei polli in Somalia. **[Infectious Laryngotracheitis of Hens in Italian Somaliland].**—*Nuova Vet.* **17.** 18–23.

R. carried out a number of animal inoculation tests with material obtained from hens involved in an outbreak of laryngo-tracheitis. The natural and the experimental disease are described. The pigeon, rabbit, and g. pig proved refractory to artificial infection.—M. W.

BRYAN, W. R., & BEARD, J. W. (1940). **Host Influence in the Characterization of Response to the Papilloma Protein and to Vaccinia Virus.**—*J. infect. Dis.* **67.** 5–24. [Authors' summary copied *verbatim*].

The dose-response curves for the papilloma protein and vaccina virus cannot be explained as due wholly to the chance presence or absence of virus particles in the inocula.

The prediction of the character of results of animal inoculation with these viruses must take into account variations in host susceptibility and resistance to infection with them.

MOROZOV, M. (1940). **Observations Concerning the Aetiology of the Paravaccine.**—*J. Microbiol., Moscou.* No. 8. pp. 25–29. [In Russian: English summary]. [Abst. in *Bull. Hyg., Lond.* **16.** 336, copied *verbatim.* Signed: H. H. S.]

The name "paravaccine" is here used to denote the virus in sheep and goats which gives rise to milkers' pustules, and contagious pustular dermatitis or stomatitis of sheep. It has nothing to do with the smallpox virus of this animal. The organism is believed to be a Strongyloplasma first described by LIPSCHÜTZ in man in 1918. The author in 1930 described the same organism as present in cows, and later in man, sheep and goats in both spontaneous and experimental infections. It is known in Russian literature, therefore, as the Strongyloplasma of Lipschütz-Morozov.

BENGTSON, I. A. (1941). **Complement Fixation in "Q" Fever.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 665–668.

The results obtained in tests with 13 human sera and five g. pig sera including controls showed that the complement-fixation test is of value for diagnosis of "Q" fever and affords evidence of immunity. A good degree of sensitivity was demonstrated; complement-fixing antibodies were present in both human and animal sera 9–13 days after the onset of the disease and persisted for at least 305 days. No fixation was obtained with sera from g. pigs inoculated with European typhus, endemic typhus, and Rocky Mountain spotted fever, thus indicating that the reaction is specific for "Q" fever. Details of the test are given and yolk-sac antigen was found superior to mouse-spleen antigen.—R. ALLCROFT.

IMMUNITY

SCHNEIDER, L., & SZATHMÁRY, J. (1939). Ueber die Immunität des neugeborenen Lammes. III. **[Immunity of New-Born Lambs. III].**—*Z. ImmunForsch.* **95.** 169–177. [For previous parts, see *V. B.* **11.** 534].

SCHNEIDER, L., & SZATHMÁRY, J. (1939). Ueber die Immunität des neugeborenen Hundes. IV. **[Immunity of New-Born Puppies. IV].**—*Ibid.* 177–188.

SCHNEIDER, L., & SZATHMÁRY, J. (1939). Ueber die Immunität des neugeborenen Kaninchens. V. **[Immunity of New-Born Rabbits. V].**—*Ibid.* 189–200.

SCHNEIDER, L., & SZATHMÁRY, J. (1939). Ueber die Immunität der neugeborenen Säugetiere. VI. Zusammenfassende Mitteilung. **[Immunity in New-Born Animals. VI. Summary].**—*Ibid.* 465–474.

III. Five pregnant sheep were immunized at five-day intervals with a killed suspension of *Salmonella typhi* and *Corynebacterium diphtheriae* formol toxoid. Examination of serum prior to immunization revealed a fairly high *S. typhi* and *Bacterium coli* agglutinin content but no diphtheria antitoxin. Immunization considerably raised the *S. typhi* agglutinin content, but in only one of the five sheep was any noteworthy production of diphtheria antitoxin evoked. In each case the agglutinin content of the colostrum was greater than that

of the blood at parturition. Blood samples of the lambs were examined before and after sucking and it was found that the agglutinin content of the serum rose considerably after sucking. It was concluded that little antibody is derived *in utero* by the lamb *via* the placenta, and that most of it is obtained through the colostrum.

IV. Three bitches half way through pregnancy were immunized with killed *S. typhi* and *Bact. coli* suspension and with diphtheria formol or alum toxoid. The bitches and their litters were investigated through two consecutive pregnancies.

In one bitch before immunization the *Bact. coli* agglutinin titre of the blood was 1 : 50 and of the colostrum, 1 : 500. Her puppies' blood before sucking agglutinated to 1 : 10, and after sucking to 1 : 50. At the next whelping, after immunization, the bitch's blood titre to *S. typhi* was 1 : 200 and that of the colostrum was 1 : 2,000. The blood contained 150 diphtheria antitoxic units and colostrum 700. The blood of the puppies of the second litter before sucking agglutinated *Bact. coli* to 1 : 10 and contained 0·57 diphtheria antitoxic units. After sucking, the blood agglutinated to 1 : 100 and contained 16 antitoxic units.

Details are given of the reactions of the other dogs. They responded readily to the immunizing injection. The colostral-milk antibody content decreased gradually. In puppies before sucking there was a significant amount of antibody, but the level did not approach that of the maternal blood; the highest antibody content was found 24 hours after sucking. The larger quantity of antibody was found to be derived from colostrum.

V. No milk could be obtained for investigation. Two gestation periods were studied in each of five rabbits. In one rabbit, before parturition, the blood agglutinated *S. typhi* to 1 : 500 and contained 6 units of diphtheria antitoxin. The blood of the young, before sucking, agglutinated typhoid to 1 : 500 and contained 3·4 units of antitoxin. After sucking the figures were the same. Another rabbit and young gave the same figures. The immunity was considered to have been transmitted *in utero*. Colostrum was of no importance in the immunity of the young rabbit.

VI. The new born of animals in the same placental group (Grosser's classification) were found to obtain immune bodies in the same way and the degree of relative importance for placental or colostral transmission was dependently correlated to the histological structure of the placenta.

In the epitheliochorial placenta (*e.g.* of the cow) with seven layers, immunity in the young is entirely colostral. In the syndesmochorial placenta with five layers (*e.g.* of the sheep) immunity is almost entirely colostral. In the endotheliochorial placenta with four layers (*e.g.* of the bitch) immunity is both colostral and placental. In the haemochorial placenta with three layers (*e.g.* of the rabbit) immunity is entirely placental.—D. L. ROBARTS.

SEIBERT, F., & GLENN, J. T. (1941). **Tuberculin Purified Protein Derivative. Preparation and Analyses of a Large Quantity for Standard.**—*Amer. Rev. Tuberc.* **44.** 9–25.

A large quantity of P.P.D. tuberculin was prepared from human strain D.T. of the Bureau of Animal Industry, lyophilized (*i.e.* dried from the frozen state) and preserved *in vacuo*, to serve as a permanent tuberculin standard. The original Seibert technique for preparation of P.P.D. was modified in the sense that steamed bacterial filtrate from growth on Long's synthetic medium was concentrated and washed by collodion ultrafiltration, and the protein then precipitated, redissolved, and reprecipitated eight times by half saturation with neutral ammonium sulphate at about 5°C. The final protein precipitate was then redissolved, freed from ammonium sulphate by ultrafiltration washing, and distributed in storage vials in such a way as to provide 50 mg. and 10 mg. units of finally lyophilized powder.

The product so obtained was purer than that obtained by the earlier trichloracetic acid process, containing 92·9% protein with only 1·2% of nucleic acid and 5·9% of polysaccharide. Physico-chemical studies indicated that it had a molecular weight of 10,500. Ultracentrifuge sedimentation curves showed some heterogeneity and electrophoretic diagrams showed the presence of at least two mobile components.

Repeated intracutaneous injections of large amounts (10 mg.) into rabbits produced a degree of sensitization (Arthus reaction) somewhat greater than that caused by the P.P.D. prepared by the previous technique, but repeated injections of small amounts (0·05 mg., *i.e.* ten times the regular dose used in the

second Mantoux test on the human subject) did not lead to significant sensitization in g. pigs. The sera of the rabbits sensitized to the large doses contained precipitins.

The potency of the new P.P.D., as determined by the Mantoux test on human subjects, appeared to be twice that of the former P.P.D. [It may perhaps be permitted to question this last finding on the grounds that potency was measured by limited comparison on dispensary patients and not by " titration " on g. pigs or on patients.]—H. H. GREEN.

SPIEGEL-ADOLF, M., SEIBERT, F. B., & HENNY, G. C. (1941). **X-Ray Studies on Tuberculin Proteins.**—*J. biol. Chem.* **137.** 503–516.

X-ray diffraction patterns of 13 samples of Seibert's tuberculin proteins showed spacings at 4·43–4·6 Å and 9·64–10·6 Å, *i.e.* within the range for other proteins under similar conditions. Determination of particle size was made for three samples by Scherrer's method and diameters of approximately 20 Å were computed. These values are in agreement with molecular diameters computed from the molecular weights and densities of the tuberculin proteins as determined by SEIBERT *et al.* [*V. B.* **9.** 554].—H. H. GREEN.

SEIBERT, F. B., & WATSON, D. W. (1941). **Isolation of the Polysaccharides and Nucleic Acid of Tuberculin by Electrophoresis.**—*J. biol. Chem.* **140.** 55–69.

Methods are described for separation of the protein, nucleic acid, and polysaccharide fractions in the bacterial filtrates from tubercle bacilli (Bureau of Animal Industry strain D.T. human) grown on synthetic medium (Long's). Two types of polysaccharides were isolated by electrophoresis and also by more conventional chemical technique. One type did not migrate in the electrical field and contained only 0·2% of nitrogen. The other, present in much larger quantity, had a low electrophoretic mobility and could not be freed from nitrogenous impurities to less than 0·85%N. Strong interaction between this polysaccharide and nitrogenous substance was evident, possibly taking the form of a layer of protein coating the polysaccharide and so conferring low mobility in the electric field. Nucleic acid was also isolated by electrophoresis of large quantities of crude fractions and its degree of purity demonstrated by analysis.—H. H. GREEN.

ARONSON, J. D., PARR, E. I., & SAYLOR, R. M. (1941). **The Specificity and Sensitivity of the Tuberculin Reaction Following Vaccination with BCG.**—*Amer. J. Hyg.* Sect. B. **33.** 42–49.

In the human subject the tuberculin reaction is an exceedingly sensitive specific test and may follow parenteral introduction of minute amounts of BCG vaccine. Of 1,383 tuberculin-negative subjects injected intracutaneously with 0·10–0·15 mg. BCG vaccine, 93·3% gave a definitely positive reaction within the following year to intracutaneous test with either 0·00002 mg. or 0·005 mg. P.P.D. Of 1,312 similar subjects left as controls in the same locality, only 12·7% reacted to P.P.D. one year after the initial negative test. The degree of allergy was less marked in those vaccinated with BCG than in those developing sensitiveness by natural infection.

Doubtful reactions with 0·00002 mg. P.P.D. were observed in 12% of the BCG vaccinated group against only 0·6% of a naturally infected group, but in all cases definite positive reactions followed re-test with 0·005 mg. P.P.D. Any doubtful reactions following injection of 0·005 mg. P.P.D. were regarded as non-specific in character.—H. H. GREEN.

JOHNSON, H. W., MILLIGAN, J. G., & COX, B. F. (1941). **Tuberculin Reactions in Cattle Infected with Mycobacterium Paratuberculosis (Johne's Disease).**—*J. Amer. vet. med. Ass.* **99.** 115–118.

Three herds were tested simultaneously with Bureau of Animal Industry tuberculin and with a johnin prepared along similar lines. In one herd doses of 0·1 ml. were injected intradermally into the right and left caudal fold respectively. In the other two the tuberculin was injected into the right caudal fold and the johnin into the left lip of the vulva.

Of the total of 347 cattle concerned, 24 reacted to the johnin test and of these nine also reacted to tuberculin. None of the 313 johnin-negatives reacted to tuberculin. The nine reactors to both tests were autopsied and all showed lesions typical of Johne's disease, but none showed lesions of TB. The data are discussed in relation to the " no visible lesion " type of reactor to the official B.A.I. tuberculin test.—H. H. GREEN.

RUIZ CASTANEDA, M. (1941). **Active Immunization against Epidemic Typhus by**

Means of Vaccines Prepared from Endemic Virus.—*Brit. J. exp. Path.* **22.** 167–172.

A practical and inexpensive method for the mass production of typhus vaccine by the phenolization of infected rat lungs is described. Vaccine prepared from the lungs of one rat may contain 4,000–10,000 g. pig protective doses.

Evidence is presented to show that lung vaccine prepared from an endemic strain of typhus will protect against the classic strain of European typhus.—JOHN FRANCIS.

SIGURDSSON, B. (1940). **Antigenic Properties of Living Tissue Cells.**—*Proc. Soc. exp. Biol.; N.Y.* **45.** 237–242.

This is an account of unfinished work in which S. describes some of the procedures adopted in his investigation of the antigenic properties of living tissue cells.

Rabbits immunized with minced chicken embryo produce an active immune serum capable of inhibiting the growth of cells in tissue culture. Absorption of the various components of active antigen by means of this serum is used as a method of finding out which part of the antigen is responsible for the production of growth-inhibiting antibody. No conclusive findings are recorded.—A. T.

DEMANCHE, R., & LEVY-BRUHL, M. (1937). Recherches sur la réaction de fixation du complément dans les infections à streptocoque. **[The Complement-Fixation Test in Streptococcal Infections].**—*C. R. Soc. Biol. Paris.* **125.** 236–238.

Culture extract from cultures of haemolytic streptococci was tested against sera from various suspected streptococcal infections in man. Eleven out of 16 cases of generalized streptococcal infection gave positive c.-f. reactions, while the sera from various cases of typhoid fever, pneumonia, and staphylococcal infections gave negative results. The sera from three horses, two immunized with a human, and one with an avian streptococcus, gave strong positive reactions with the extract from a human streptococcus.

The authors considered that, although a positive c.-f. test constituted a reliable diagnostic test, a negative result did not eliminate the possibility of streptococcal infection. It is stated that results of serological work suggested that *Str. pneumoniae* and streptococci in general possess a common lipoid fraction in their antigenic structure.—R. O. MUIR.

ECKER, E. E., KOVACS, J., & PILLEMER, L. (1939). **Complement in Anaphylactic Shock.**—*Enzymologia.* **7.** 305–306. [In English].

A fall in complement titre has been reported by some workers in cases of anaphylactic shock while others have observed no such decrease. Results are presented which show that complement is not always decreased during anaphylaxis. Of 74 guinea pigs studied, 24 showed severe anaphylaxis with loss of complementary activity ranging from 20–67. The remaining 50 animals showed varying degrees of mild shock or no shock at all with little or no fall of complement titres. No difference was observed in the case of animals kept on a vitamin C deficient diet. It was not possible to reactivate the weakened complement by the addition of ascorbic acid, glutathione SH, KCN, or H_2S; this suggests that the fall of complement in anaphylaxis is not associated with an *in vivo* oxidation change.—R. ALLCROFT.

ECKER, E. E., KALINA, R., & PILLEMER, L. (1939). **The Explanation of an Apparent Inactivation of Complement by Alloxan.**—*Enzymologia.* **7.** 307–309. [In English].

Because of its oxidizing ability and affinity for the hydrogen of –SH groups, the effect of alloxan on complement was studied in rabbits. The gradual fall of initial complement titres after the injection of alloxan was found to be due to the effect of haemorrhage and not to the oxidative effect of alloxan. A series of *in vitro* tests showed that alloxan inhibited complementary activity by the production of a pH of 6 or under; neutralization of the mixtures restored the lower complement titres to normal.—R. ALLCROFT.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

HASEMAN, L., & ROLAND, W. E. (1941). **Controlling Bot and Warble Flies of Livestock in Missouri.**—*Bull. Mo. agric. Exp. Sta.* No. 430. pp. 32.

In Missouri, there are six important species of flies belonging to the botfly group, namely

Gastrophilus intestinalis, *G. nasalis*, *G. haemorrhoidalis*, *Hypoderma lineatum*, *H. bovis*, and *Oestrus ovis*.

G. haemorrhoidalis appears to be a recent invader of the state, while *H. bovis* is only occasionally reported. *O. ovis* is most abundant in the west and south-west of the state. The bulletin contains a summary of the life-history and usual methods of control of these pests.

—W. MOORE.

YAMASHITA, J., & TOSA, K. (1940). **Studies on Myiasis of Wild Animals in Manchoukuo. I. On Subcutaneous Myiasis of *Capreolus mantchuricus* (Noak).**—*Jap. J. vet. Sci.* **2.** 375–385. [In Japanese: abst. from English summary].

Larvae obtained from roe deer in North Manchuria (Lungmen Mountain) were determined as those of *Hypoderma diana*, the common warble fly of deer. The species has not been recovered from cattle, and the authors conclude that it is not important from the point of view of eradication of cattle warbles.

—J. MACLEOD.

ULLYET, G. C., & DE VRIES, A. H. (1941). *Bembix* **Wasps as Enemies of Sheep Blow Flies.**—*Fmg S. Afr.* **16.** 19–20.

A sudden decrease in the blowfly population was noticed to be associated with the presence of *Bembix* wasps which have been seen to catch the flies. A study of the life-history and environmental conditions of the wasp have shown that it is a slow breeder with few natural enemies and requires special conditions for its survival. Owing to these environmental requirements, distribution is confined to certain topographical regions. It feeds on any type of fly but will kill mainly blowflies if they are the commonest type available. It is sun-loving and does not come out in dull weather. It breeds in river beds or sandbanks at the edges of rivers and is only found near rivers. Special conditions of humidity are required in the nests.

This wasp probably plays a useful part in keeping down the numbers of blowflies. It would, however, be useless to liberate it in unsuitable places or at any other time than when it is naturally abundant which coincides with the time when blowflies are numerous.

—E. M. ROBINSON.

CRAUFURD-BENSON, H. J. (1941). **The Cattle Lice of Great Britain. Part I. Biology, with Special Reference to *Haematopinus eurysternus*. Part II. Lice Populations.**—*Parasitology.* **33.** 331–342 and 343–358.

I. Observations are described on the distribution in Britain and on the life-history of *Bovicola bovis*, the biting louse of cattle, and of the three British species of sucking lice, *H. eurysternus*, *Linognathus vituli*, and *Solenopotes capillatus*. The distribution records are based principally on specimens sent by farmers in answer to a *questionnaire*. *B. bovis* occurred most commonly and in all parts of Britain; *H. eurysternus* was the next most common, and occurred more frequently in England than in Scotland; *L. vituli* was received mainly from western areas, while *S. capillatus* was only rarely recovered.

The incubation period for eggs of *B. bovis* averaged eight days, of *H. eurysternus* 12 days, and of *L. vituli* and *S. capitallatus* 10–13 days. The biology of the larval and adult stages of *H. eurysternus* only was studied. The complete life-cycle from egg to egg averaged 28 days, the three larval instars each occupying on an average four days. Oviposition began, irrespective of fertilization, in 2–7 days and 1–4 eggs per day were laid. The maximum number laid by one female was 24. No development of eggs took place below 27·5°C. Humidity, except at the extremes of 0 and 100 R.H., appeared to have no effect on development or hatching. Females survived longer than males on the host, the maximum longevity obtained being 16 days. No post-embryonic stage survived four days off the host. Partially developed eggs were able to survive exposure to winter temperatures for about a week, but recently laid eggs were less resistant.

II. Observations are recorded on seasonal changes in natural populations of lice, based on monthly examinations of a herd of ten dairy Shorthorn yearlings. All four species showed a decrease in numbers in spring, the infestations of *L. vituli*, and in some cases of *B. bovis*, actually dying out. The numbers of *H. eurysternus* and *B. bovis* began to increase again in autumn. Observations on *S. capillatus* were not recorded beyond the summer.

During the winter period of high density, *H. eurysternus* was found principally on the neck, rump, and perineum, and, to a lesser extent, on the head, brisket, and tail. With the onset of warm weather the population centres shifted to the ears, the base of the horns, and

the tail. *S. capillatus* was found chiefly on the cheeks, side of neck, and brisket. *B. bovis* occurred all along the dorsal area in winter, but in summer was confined to the tail.

It is suggested that distribution and seasonal activity are correlated with light intensity, and that the effect of the spring increase in sunshine is accentuated by the shedding, at this season, of the winter coat, which has been acting as a light filter.—J. MacLeod.

Snipes, B. T., Carvalho, J. C. M., & Tauber, O. E. (1940). **Biological Studies of** *Ornithocoris toledoi* **Pinto, the Brazilian Chicken Bedbug.**—*Iowa St. Coll. J. Sci.* **15.** 27–36.

The species was first discovered near São Paulo, Brazil, and has since been reported from the region of Minas Geraes, Brazil. It is a serious pest of chickens in these areas and was found experimentally to feed on turkeys, ducks, and pigeons. It apparently does not attack man.

The life-cycle, on chickens, averaged 48 days, varying from 36–85 days; during this period the various stages fed a total of 9–14 times. The egg, nymphal stages, and adult are briefly described.—J. MacLeod.

Headlee, T. J. (1940). **The New Jersey Tick Problem.**—*Circ. N. J. agric. Exp. Sta.* No. 395. pp. 12.

H. gives a brief popular account of the five species of Ixodid ticks occurring in New Jersey. *Haemaphysalis leporis-palustris*, *Amblyomma americanum*, and *Ixodes cookei* are very briefly dismissed, and the rest of the circular deals with the biology and habits of the two species of dog tick, *Rhipicephalus sanguineus*, which is apparently spreading from the tropical to the temperate zones of the U.S.A., and *Dermacentor variabilis*, the common dog tick of North America.

Dusting infested dogs with a derris root plus talc preparation is recommended. Derris and pyrethrum sprays are effective against the brown dog tick, *R. sanguineus*, infesting buildings, but the eradication of the American dog tick, *D. variabilis*, is more difficult because of its habit of passing the early stages on wild rodents. —J. MacLeod.

Bingham, M. L. (1941). **A Note on the Bionomics of** *Ixodes ricinus* **L.**—*Parasitology.* **33.** 316–319.

B. records that in each of three batches of *I. ricinus* larvae, fed in July and maintained at room temperature, some nymphs emerged after 6–8 weeks, but others of the same batch showed a delayed ecdysis, emerging only after periods of 48–51 weeks. The temperature and humidity conditions during this period were not recorded. Attention is drawn to the importance of this prolonged developmental period in control measures based on the longevity of ticks.—J. MacLeod.

Roveda, R. J. (1940). Primera contribución al estudio de la bionomia del Argas persicus. [**Bionomics of** *A. persicus*]. —*Inst. Parasit. Fac. Agron. Vet., Univ. B. Aires.* **1.** No. 6. pp. 22.

By incubation methods, R. found that the optimum conditions for the development of the eggs of *A. persicus* were a temperature of 22°–38°C. and relative humidity of 80–100%. Under these conditions only 4·86% of the eggs did not hatch out. A temperature of 37°–38°C. with R.H. of 80–95% was not conducive to good development and at least 22% of the eggs did not hatch. In the Argentine all the area north of latitude 38° is suitable for the successful hatching of the eggs.

Regarding the larvae, R. found that with a temperature of 22°–26°C. and R.H. of 90–100% they lived for 228 days without food. A temperature of 37°–38°C. with R.H. of 85–100% reduced the resistance of the larvae, some of which died after four days without food. Climatic conditions in the Argentine, north of latitude 38°, are very favourable for the survival of the larvae without food.—Miller Watson.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Pou, M. C. (1938). Consideraciones sobre el problema de la equinococosis. [**The Problem of Echinococcosis**].—*Bol. Fac. Agron. Vet., Univ. B. Aires.* No. 19. pp. 40.

This is a review of present knowledge of echinococcosis with some statistics from various abattoirs in Montevideo. At the Artigas abattoir the percentage of unaffected cattle livers was as low as 7·7 in 1929 and the average percentage over the period 1929–37 was only about 40. At the Swift abattoir, during the period 1933–36, the average percentage of unaffected livers of cattle was only 16·6, of

calves 74·6, of sheep 41·9, and of pigs 50·7. —MILLER WATSON.

I. CARTA, A. (1939). L'identificazione del ciclo evolutivo del *Mesocestoides lineatus* provata sperimentalmente. [**The Development Cycle of** *M. lineatus*].—*Riv. Parassit.* **3.** 65–81.

II. CARTA, A. (1939). Il Tetrathyridium bailleti può riprodursi ? [**Reproduction of** *T. bailleti*].—*Profilassi.* **12.** 71–73. [English, French and German summaries].

III. CARTA, A. (1940). Sulla cosidetta ascite parassitaria di Sendrail e Cuillè. [**Parasitic Peritonitis of Dogs** (*Tetrathyridium bailleti* **Infestation**)].—*Ibid.* **13.** 55–60. [English, French and German summaries].

I. In a previous paper [*V. B.* **11.** 871.], C. described in dogs and cats three larval forms of *M. lineatus*, *viz*, a cysticercus, a solid heart-shaped larva, and an elongate solid one [but see also SRIVASTAVA—*V. B.* **10.** 682]. In this paper he reports finding these three forms again. He gave solid larvae by means of a stomach tube to two dogs which had previously been treated with anthelmintics, and to two other similarly treated dogs he gave cysticerci. At autopsy on the 109th day he found adult forms of *M. lineatus*.

II. C. performed laparotomy on three young dogs and introduced into the peritoneal cavity ten elongate *T. bailleti*. As far as possible during the operation he examined the cavity for larvae already present but saw none. In one dog, destroyed after three months, 23 larvae were found in the abdominal cavity. The second dog was destroyed after four months, when 31 larvae were found. The third dog had 29 tetrathyridia in the abdominal cavity when destroyed after five months. Some of the larvae of the elongate type had strictures in their length, suggesting a process of division and others appeared with a small vesicle. C. suggests that this indicates possible agamic reproduction.

III. C. examined two dogs affected with parasitic peritonitis and found the abdominal organs to be covered with a granular material composed of inumerable small vesicles adherent to each other and to the organs. The peritoneum was greatly thickened with fibrous villiform growths. *T. bailleti* was found in the granular material.—MILLER WATSON.

ROSA, W. A., & GALOFRE, E. J. (1940). Estrongilidios del caballo. [**Strongyles of Horses**].—*Inst. Parasit. Fac. Agron. Vet., Univ. B. Aires.* **1.** No. 7. pp. 63.

This paper deals briefly with the biology of the strongyles and methods of diagnosis of equine strongylosis. The species found in Argentina are described in detail and illustrated with line drawings.—MILLER WATSON.

STEWART, W. L., & CROFTON, H. D. (1941). **Parasitic Gastritis in Cattle.**—*Vet. Rec.* **53.** 619–621.

The authors give data on parasitic gastritis as it affects young bovines up to two years of age in the north of England ; these data support TAYLOR'S opinion [*V. B.* **4.** 742.] that the disease may be widespread but remain unrecognized and, further, that it is a disease of major importance in non-productive bovines. *Trichostrongylus axei* was the predominant species present. Some measure of control was obtained by frequent dosing with copper-nicotine solutions or copper-arsenic powders.

An experimental treatment of 15 cattle, 15–18 months of age, with phenothiazine in order to control winter losses is detailed. Five animals (group 1) received two doses at a month's interval of 100 g. of phenothiazine suspended in water, five (group 2) received two doses of 100 ml. of a mixture containing 5% each of copper sulphate and nicotine sulphate in water, and the remaining five (group 3) acted as controls. The weights of the animals before and after the six months' trial showed beneficial results in the order of group 1, group 2, group 3. A statistical analysis of these weight changes showed a significant ($P = 0{\cdot}02$) difference between those of groups 1 and 3 only. Egg counts by a modified Gordon-Whitlock method showed a significant reduction in group 1. The results are tabulated and discussed.—C. V. WATKINS.

HOLMAN, H. H., & PATTISON, I. H. (1941). **A Study of the Blood Picture of Lambs Suffering from Parasitic Gastritis.**—*Vet. Rec.* **53.** 491–498.

Thirty-five lambs with parasitic gastritis were removed from pasture and folded on cabbage. Eighteen of them were treated with phenothiazine at the rate of 0·75 g. per kg. body weight, and the remainder acted as controls. Within three weeks the treated group gained an average of 9·5 lb. per head compared with

3·2 lb. for the controls, a statistically significant difference. The reduction of egg counts was greater for the treated group.

Haematological investigations were carried out on five treated and five untreated lambs, all of which initially showed a hypochromic anaemia. Price-Jones curves were found to be normal in all cases and their various implications are discussed. Blood viscosity figures were high but fragility test values were normal. The type of anaemia is discussed, and the suggestion is made that it was neither post-haemorrhagic nor haemolytic, but that it appeared to be of the general type of an alimentary anaemia. This anaemia, it is suggested, was pathologically unimportant compared with other detrimental factors which inhibited growth.

Following phenothiazine treatment there was a fall in the r.b.c. count and Hb values, and this fall was correlated with the weight gain in accordance with a simple algebraic expression. Changes in the leucocyte count are also given and where an eosinophilia occurred the authors suggest that this was connected with the process of recovery and was not associated with the liberation of eosinotactic substances by the parasites. Comment is also made upon the high level of basophiles found. Some interesting data on various aspects of the haematology of sheep are given.—ALFRED EDEN.

STOLL, N. R. (1940). **In vitro Conditions Favoring Ecdysis at the End of the First Parasitic Stage of Haemonchus contortus (Nematoda).**—*Growth.* **4.** 383–406.

S. found that third-stage larvae of *H. contortus* will moult into the fourth stage *in vitro* under sterile conditions. Ecdysis occurred in balanced salt solutions such as Tyrode or Ringer, but not in normal saline, tap water, or distilled water. More favourable results were obtained with balanced salt solutions at less than the usual physiological concentrations for mammalian or bird tissues, that is, at a dilution of $\frac{3}{4}$–$\frac{1}{4}$, which represents a concentration of 40–120 millimols per litre (normal saline at 0·85% represents 145 millimols per litre). For best results a certain low oxygen tension was required, which was obtained by the use of small tubes, with moderate amounts of media, which were sealed after inoculation. Better results followed with larger than with smaller numbers of larvae in the inoculum. Ecdysis was accelerated in the presence of aqueous liver extracts.—M. L. BINGHAM.

HOBMAIER, M. (1941). **Newer Aspects of the Lungworm (*Crenosoma*) in Foxes.**—*Amer. J. vet. Res.* **2.** 352–354.

H. notes the similarity in morphological and biological characters between *C. mephitidis* from skunks and *C. vulpis*. When infective larvae of *C. mephitidis* were fed to six young dogs, two died after 3–8 weeks and the others developed shortness of breath and passed first-stage larvae in their faeces from the 19th day onwards. A second passage was possible through pups, but not through two- and three-year-old dogs. Four foxes 4–6 months old, believed to be free from internal parasites, were fed third-stage larvae. They refused food ten days later and commenced voiding larvae at the 19th day. All died in one month. No adult worms were found in the bronchi but a typical broncho-pneumonia was present. Third-stage larvae cultured from those voided induced lungworm infestation in puppies. The fox is therefore an alternative host of *C. mephitidis*. Distemper virus was not excluded as a possible cause of death. *Brucella bronchiseptica* and *Bacterium coli* which were isolated from the four foxes may have been responsible. H. considers, however, from similar results with other lungworm transmission experiments, that an abnormally heavy lungworm infestation at one time is the most likely explanation.

C. mephitidis apparently causes little upset to skunks, more to puppies, and is most pathogenic for foxes. The present findings may account for difference of opinion with regard to the pathogenicity of *C. vulpis* to foxes.

Garter snakes from the same region as naturally infested skunks had numerous small nodules, in and under the intestinal mucous membrane, each containing a third-stage larva of *C. mephitidis* as proved by feeding tests with puppies and two foxes, the latter dying within a month.

First-stage larvae of *C. mephitidis* were found to survive drying for six weeks.—C. V. W.

RIPPLE, R. C. (1941). **Studies on the Gape-worm *Syngamus trachea* (Montagu, 1811) in Robins and Chickens.**—*J. Parasitol.* **27.** 369–374.

R. concludes, on morphological grounds, that *S. tenuispiculum* Manter and Pinto, 1928, recovered from the American robin in Nebraska,

is identical with *S. trachea*. Young chickens could not be infected by feeding them with infective eggs or larvae of the robin gapeworm, or with earthworms (*Helodrilus caliginosus*) from soil seeded with the infective eggs. Infection was obtained in one of six chickens fed with earthworms (*Eisenia foetida*) containing the eggs. Two of six chicks were infected after receiving large doses of eggs which had been in cold storage for six months before incubation. A young robin was found to be infected after being fed with *H. caliginosus*, from soil seeded with robin gapeworm eggs, but this bird may have harboured the parasite before its capture. No infections resulted in robins from feeding with *E. foetida* containing chicken gapeworm eggs. Thus, although cross-infection experiments appear to confirm the identity of the robin and chicken gapeworms, it seems doubtful whether such cross-infections occur in nature.—M. L. BINGHAM.

SARLES, M. P. (1939). **Protective and Curative Action of Immune Serum against Nippostrongylus muris in the Rat.**—*J. infect. Dis.* **65.** 183–195.

Passive immunity to *N. muris* was produced in rats by intraperitoneal or intravenous injections of immune serum. The manifestations of passive immunity are the same as for active immunity and include retention of a few worms in the skin and larger numbers in the lungs, slight delay in the appearance of eggs in the faeces, premature crisis in the egg-count curve, greatly decreased egg output, and presence of fewer and smaller worms in the intestine at P.M. examination. The degree of passive immunity depends upon the dosage and poteney of the serum and the time of inoculation. Since passive immunity is not as effective as active immunity and is only temporary, it is best limited to a degree of immunity which will not interfere too much with the development of active immunity. If raised beyond this degree the initial acute peak in egg production may be inhibited and later active immunity will not be developed. These results support the view already advanced [see *V. B.* **11.** 235.] that acquired immunity to *N. muris* is primarily of antibody origin.

—M. L. BINGHAM.

DISEASES, GENERAL

BELLER, K. (1939). Ruhrähnliche Erkrankungen der Jungtiere, verglichen mit den entsprechenden Erscheinungen beim menschlichen Säugling. [**Diarrhoeic Diseases of Young Animals Compared with Similar Disease in Infants**].—*Ergebn. allg. Path. path. Anat.* **34.** 563–644.

This article is mainly a comprehensive review of diseases in animals (including birds) which result in diarrhoea in the young within a few days or weeks of birth. Some comparisons are made with diarrhoeic diseases of infants. There are over 300 references to the subject, classified under several headings and those interested in the subject should consult the original.

The importance of constitutional factors in relation to diarrhoea in young animals is stressed, selection of breeding stock, hygienic conditions, soil, and diet being some of the factors considered. Intra-uterine infection is dealt with in detail under two headings, *viz*, (1) descending infection of the foetal membranes and foetus as a result of generalized disease in the dam such as contagious pleuro-pneumonia in sheep, brucellosis, and swine fever; (2) ascending infection from the vagina and uterus, including a consideration of the persistence of saprophytic organisms in the pregnant uterus. B. considers that a healthy uterus and foetal membranes are essential for the production of a healthy new-born animal and he suggests that intra-uterine infection is an important factor in the production of diarrhoea in young animals, especially of "white scours" in calves. It is suggested that at least some cases of "white scours" are due to congenital weakness of the mucosa of the alimentary tract which facilitates invasion of *Bacterium coli* and results in death from *coli* septicaemia.

Other diseases dealt with include enterotoxaemia in lambs and the various specific paratyphoid infections of young domestic animals.

Infection of the egg usually results either from ovarian disease, or by extension of infection from the cloaca along the oviduct. Occasionally, the egg may be infected through the shell after being laid, especially when incubator hatched. There is a discussion of

salmonella infection of the egg in ducks, geese, and pigeons.—E. G. WHITE.

DOBBERSTEIN, J. (1941). Die Entzündungen des Zentralnervensystems der Tiere. Kritisches Sammelreferat (1938–1940). [**Inflammatory Conditions of the Central Nervous System of Animals. Critical Review (1938-40)**].—*Berl. Münch. tierärztl. Wschr.* August 29th. 420–425.

A useful review of work published during 1938–40 in various countries on inflammatory conditions in the c.n.s. of animals, including birds. A wide variety of conditions is covered including the virus diseases that affect the c.n.s. There are 158 references.—E. G. WHITE.

KRANEVELD, F. C., & DJAENOEDIN, R. (1940). Onderzoek naar de oorzaken van lymphklierzwellingen bij inheemsche geiten. [**Lymphadenitis in Javan Goats**].—*Ned.-ind. Bl. Diergeneesk.* **52.** 93–97. [English and German summaries]. [Abst. from English summary].

Enlargement of the lymph nodes is found fairly frequently in Javan goats. Various strains of staphylococci were isolated from 86 of 100 affected nodes examined, but *Corynebacterium ovis* was not isolated from any cases. *Ectotrichophyton lacticolor* was isolated twice and *Aspergillus fumigatus* once from three prescapular lymph nodes.

WYSSMANN, E. (1941). Ueber zerebrale, mit Juckreiz bzw. Leeksucht verbundene Erkrankungen beim Rind. [**Cerebral Disease of Cattle Combined with Itching and Pica**].—*Schweiz. Arch. Tierheilk.* **83.** 292–306.

Six cases of severe nervous disease in cows are described, occurring during a period of 30 years. The affection was in one case diagnosed as meningitis and in the others as obscure affections of the brain or nerves subsequent to other illness. In most of the cases the onset was sudden though some irritability of the skin might have been previously observed. None of the six animals showed acetonuria which had been observed by other workers who reported similar conditions in cattle. Differential diagnosis from Aujeszky's disease is discussed with reference to the histological findings on the brains of the animals. The nature and aetiology of the condition are considered to be obscure and careful study of any new cases is recommended.—A. M. COPPING.

CELLA, F. (1939). Sopra un secondo caso di granuloma venereo del cane (C.D. sarcoma de Sticker) osservato nell' Emilia.—Metastasi splenica. [**Case of Venereal Granuloma in a Dog in Emilia. Spleen Metastasis**].—*Nuova Vet.* **17.** 217–220.

During life the growths were apparent only on the prepuce, but at P.M. examination two metastatic growths were found in the spleen. C. states that the disease was formerly believed to be confined to southern Italy and Sicily, but he has now seen two cases in Emilia.—M. W.

TAGLE, E. C., & HELMAN, M. B. (1940). Prognatismo—organos genitales—rastros de cuernos en lanares. Fallas de aplomo y de conformación. [**Prognathism—Malformation of Genital Organs—Traces of Horns in Hornless Breeds of Sheep—Incoordination and Malformation of the Limbs**].—*An. Soc. rur. argent.* **74.** 989–992.

This is a list of hereditary defects to be avoided in breeding cattle and sheep. It includes undershot and overshot jaw, cryptorchism, underdevelopment of genital organs, vestigial horns in hornless breeds, weak hocks and knees, narrow chest and pelvis, and hollow back and partial pigmentation in non-pigmented breeds.—MILLER WATSON.

BORZHKOVSKIĬ, S. E., & KARPENKO, M. K. (1938). Odmin rechovin u koneĭ, khvorikh na trikhoreksis. I. Khemichniĭ sklad volosu khvorikh i zdorovikh koneĭ. [**Metabolism in Horses Suffering from Trichorrhexis. I. Chemical Composition of the Hair in Diseased and Healthy Horses**].—*Biochem. Z. Kiev.* **12.** 591–599. [In Russian: abst. from English summary].

Cystine, calcium, ash, total nitrogen, and sulphur were determined in 112 samples of hair from healthy horses and from horses affected with trichorrhexis. A slight increase in the percentage of cystine and a decrease in the percentage of Ca and ash were observed in the hair from the affected horses. It is claimed that this decrease in Ca and ash content is characteristic in cases of trichorrhexis.

HANCOCK, R. C. G. (1941). **The Relationship Between Canine Hysteria and Dog Biscuit.**—*Vet. Rec.* **53.** 549–550.

H. records the experimental feeding of a

consignment of dog biscuit supplied by a firm of manufacturers, after it had been returned to them with a history of having been the source of a hysteria outbreak. The biscuits were fed to ten dogs, nine of three years old and under and one aged dog. In every case, 4 oz. of dry biscuits were fed twice daily and in one case milk was added. After an interval varying from 52–248 hours after feeding was commenced, hysteria developed in all except the aged dog. The interval appeared to increase according to the length of time (70–317 days) that the biscuits were kept before feeding started. Neither the addition of milk nor that of a mineral mixture (" admin ") had any effect on the development of the condition. The aged dog was fed the biscuit for seven days and only high blood pressure was recorded. A second attack was induced in one case after an interval of 14 days after a second feeding.

H. suggests that flour from the Far East is the usual source of the disease, possibly because of a pollen or seed contamination of inferior quality grain, and suggests that the disease is a form of allergy. The causal agent presumably resists heat because it survived the cooking of the biscuits, but H. suggests that a freezing process might be tried to inactivate hysterigenic biscuit.—C. V. Watkins.

Hueper, W. C. (1941). **Rhabdomyomatosis of the Heart in a Guinea Pig.**—*Amer. J. Path.* **17.** 121–124.

The microscopic appearance of rhabdomyomatosis in the heart of a g. pig is described. It is identical with that hitherto recorded only from the human heart. Glycogen contained in the muscle cells in this condition is much more soluble in ordinary fixatives than that present in myocardial cells in von Gierke's glycogen storage disease.—M. L. Bingham.

Lee, C. D., & Wilcke, H. L. (1941). **Transmission Experiments with Iritis of Fowls.**—*Amer. J. vet. Res.* **2.** 292–294.

Iritis is one manifestation of the " fowl paralysis complex " ; many spontaneous field outbreaks of iritis have occurred during the last few years and these suggest transmission by affected breeding stock. The authors undertook breeding experiments, using iritis-affected birds as it was found that paralysed hens either could not be mated, or were not productive, or that their eggs, if fertile, died during incubation or yielded weakly chicks. It is concluded that the iritis condition is probably more dangerous genetically than the paralytic condition, as affected hens are usually productive. The chicks from such stock (examined to avoid using any affected other than by iritis as far as possible) were incubated and reared as separate pedigree groups, placed in colony houses off the ground, and observed for 14 months.

Mating experiments were carried out. Three matings were made, (1) iritis males on iritis females, (2) normal males on iritis females, (3) iritis males on normal females. Two pens of 20 females each were used in each mating. Of 32 chicks from (1), five showed typical fowl paralysis, seven iritis, three lymphocytoma, one myeloid leucosis, three erythroleucosis, and two osteopetrosis, while five died from other causes. Of 30 chicks from (2) five had paralysis, five iritis, two lymphocytoma, three myeloid leucosis, and five died from other causes. Of 46 chicks from (3), three had paralysis, one lymphocytoma, two iritis, and six died from other causes.

Transmission of ovarian tissue from an iritis hen to 27 susceptible week-old chicks by intraperitoneal injection induced the complex in four. Twenty-eight controls all remained healthy.

Transmission of 0·5 ml. of heparinized blood from the same hen to 28 susceptible week-old chicks by intracardial injection induced the complex in 12, while 20 controls remained healthy.

Transmission of 0·05 ml. of the pooled blood of five chicks from iritis male and female matings by intracardiac injection into 35 susceptible week-old chicks induced some form of the complex in 19, while 25 controls remained healthy.

The authors' detailed results are claimed to show the unity of aetiology of erythroleucosis, myeloid leucosis, lymphocytoma, iritis and neurolymphomatosis gallinarum.—C. V. W.

Hall, W. J., Bean, C. W., & Pollard, M. (1941). **Transmission of Fowl Leucosis Through Chick Embryos and Young Chicks.**—*Amer. J. vet. Res.* **2.** 272–279. [Authors' summary copied *verbatim*].

A field strain of neural lymphomatosis with leucemic tendencies after 17 serial passages through young chicks became an apparently pure leucosis type (known as strain A). This change was accompanied by a marked reduction

in the incubation period as well as by an increase in the percentage of takes.

Some evidence is presented which could indicate that leucosis (strain A) is filtrable. Leucosis, strain A, infected chick embryos only when inoculated intravenously. The disease was transmitted through chick embryos to chicks by either tissue suspensions or blood. Some evidence is furnished that passage through chick embryos caused some enrichment of the virus on further serial passage in chicks. Difficulty was experienced in serial passage of the virus through chick embryos.

KABAT, E. A., & FURTH, J. (1941). **Neutralization of the Agent Causing Leukosis and Sarcoma of Fowls by Rabbit Antisera.**—*J. exp. Med.* **74.** 257–261. [Authors' summary copied *verbatim*].

Neutralizing antibodies against fowl tumor agents can be produced in rabbits by injection of heavy materials obtained from chicken tumor. Similar sediments from normal chicken spleen produce no neutralizing antibodies. The complement-fixing antibodies produced by both materials are unrelated to the neutralizing antibodies.

KIRSCHBAUM, A., STERN, K. G., & HOOKER, C. W. (1940). **Studies on Fowl Leukosis. Transfer with Fractions Obtained by Ultracentrifugation of Leukemic Plasma and Bone-Marrow Extracts.**—*Yale J. Biol. Med.* **13.** 1–14. [Abst. in *Exp. Sta. Rec.* **84.** 677, copied *verbatim*].

Work with the filtrable agent of fowl leucosis is reported. The sedimented material did not appear to possess a greater total activity than the material from which it was derived (crude marrow extract or plasma). None of the agent was sedimented at 6,000 r.p.m. (½ hr.). Sedimentation was incomplete at 30,000 r.p.m. (½ to 1 hr.). The material responsible for the induction of leucosis was not completely sedimented at a single speed, indicating a variation in size of the particles associated with activity of the agent. As sedimented from crude marrow extracts, the agent was not filtrable. The resistance to both cells and agent appeared to increase with age. Susceptibility to filtrable agent plus leukemic cells (blood) or washed cells was greater than to the agent alone. Although activity of the agent manifested itself first in the bone marrow, intra-amniotic inoculation of 7-day embryos, before the appearance of bone marrow, resulted in the development of leukemia after hatching.

HALBERSTAEDTER, L., DOLJANSKI, L., & TENENBAUM, E. (1941). **Experiments on the Cancerization of Cells *in vitro* by Means of Rous Sarcoma Agent.**—*Brit. J. exp. Path.* **22.** 179–187. [Authors' summary copied *verbatim*].

Cells of a Rous chicken sarcoma culture are destroyed by doses of radium which are without effect on the activity of the sarcoma agent. With the method employed the "immediate lethal effect" for sarcoma cells was attained after 36 hours' irradiation; sarcoma agent was still active after 96 hours' irradiation.

The pathogenicity of 36 hours' irradiated cultures disappears when cultures are placed in the incubator for 48 hours immediately after irradiation. It is possible to maintain the activity of sarcoma agent by adding normal cells to irradiated sarcoma cultures.

Normal cell cultures combine *in vitro* with active sarcoma agent from irradiated cultures, and acquire in the course of passages all the morphological and biological characteristics of sarcoma cell colonies which are maintained *in vitro*. Such cell strains remain permanently pathogenic.

When Rous sarcoma is cultivated *in vitro* with the addition of normal tissue according to the method of Fischer, there occurs besides a multiplication of the original sarcoma cells, also a continuous cancerization of the normal tissue added.

DURAN-REYNALS, F. (1941). **Age Susceptibility of Ducks to the Virus of the Rous Sarcoma and Variation of the Virus in the Duck.**—*Science.* **93.** 501–502.

Ducks can be infected with the Rous chicken sarcoma virus provided that they are inoculated within a short period after birth, preferably by the intravenous route, and that large amounts of the virus are used. This intravenous infection gives rise to two conditions, *viz*, (1) development of a haemorrhagic disease with blood blebs and extravasations in the viscera, which is fatal within a few weeks, and (2) development of sarcomas several weeks or months after injection.

Once tumours are induced in ducks the disease can be easily transmitted to other ducks without regard to age. This infection in ducks

is attended by a variation in the virus shown by its inability to infect adult fowls, and young chicks injected intravenously with the duck variant develop a disease wholly different from that induced in them by the original virus.

—R. F. GORDON.

NELSON, A. A., & MORRIS, H. J. (1941). **Reticulum Cell Lymphosarcoma in Rats.** —*Arch. Path.* **31.** 578–584. [Authors' summary copied *verbatim*].

Few series of cases of lymphosarcoma in the rat have been reported. Among 323 rats we found 35 with pulmonary lymphosarcoma of the reticulum cell type, originating in the lymphoid accumulations around the large bronchi. The mediastinal lymph nodes and thymus were never the source of the tumor. More or less extension into the mediastinum was present in 23 of 35, and metastases in lymph nodes or viscera occurred in 6 of the 35 tumor-bearing rats. Thirty of the 35 rats were over 24 months of age.

LANFRANCHI, A., & SEREN, E. (1939). Ulteriori esperienze su di un intervento biologico nella cura dei tumori benigni e maligni. **[Treatment of Benign and Malignant Tumours with Injections of Tumour Material].**—*Nuova Vet.* **17.** 3–6, 39–45, 68–78, 103–108, 143–148, 196–202, 231–243, 264–273, 299–309; **18.** 4–8, 42–44, 71–72.

Using tumour material, submitted to a special process which is not described, the authors treated animals affected with a considerable number of naturally occurring tumours.

The material was applied endermically, intradermally or subcutaneously to bovines with papillomas. Some cases were treated with auto-material, others with homologous tumour material, and the percentage of cures was high. The tumours first showed some increase in size, then became increasingly cornified and finally atrophied and fell off spontaneously or could be shelled out with slight pressure without haemorrhage. Histological sections during the process of treatment showed thrombosis and a great reduction in the blood supply. Material from human sarcoma proved equally effective in some cases, as did also material from the spleen of a man suffering from lymphosarcoma.

Sarcomas in bovines were treated with injections of spleen material from a human case of lymphosarcoma and material from Peyton-Rous sarcoma of a fowl. Clinical cures were obtained in 33–110 days.

Papillomas in horses were treated with material from bovine papillomas, with cures in 14–30 days. Fibromas in horses were also treated successfully with material from bovine papillomas, and sarcomas were treated with materials from various tumours including human sarcoma, with good results.

In dogs, papillomas, adenomas and adenocarcinomas of the mammary gland were treated with heterologous tumour material, clinical cures being obtained. Sarcomatous epulis were also treated successfully, as were epitheliomas.—MILLER WATSON.

NUTRITIONAL AND METABOLIC DISORDERS

HEANE, C. W., & SIMPSON, K. S. (1939). **Some Observations on Equine Osteomalacia in China.**—*J. R. Army vet. Cps.* **10.** 153–157.

The aetiology, pathology, symptoms, prophylaxis and treatment of equine osteomalacia in China are described. No new information is given.—R. ALLCROFT.

NOLAN, A. F., & HULL, F. E. (1941). **Grass Tetany in Cattle.**—*Amer. J. vet. Res.* **2.** 41–45.

Although the hypomagnesaemic condition of calves known as "milk tetany" was first reported in America by DUNCAN, HUFFMAN & ROBINSON, the "grass tetany" of cows characterized by pronounced hypomagnesaemia and moderate hypocalcaemia, first described by SJOLLEMA in Holland and subsequently by DRYERRE and others in this country (as "lactation tetany") and by various investigators in New Zealand and elsewhere, seems to have escaped study in America itself.

The present paper is, therefore, of interest as reporting blood analyses on 12 cases, in which serum Mg averaged 0·9 mg.% and serum Ca 6·6 mg.%. Of the 12 cases, 11 appeared during the winter when the animals were on poor quality hay, but the authors report that the commonest incidence in central Kentucky occurs shortly after cows have been turned out

to young rank grass in early spring, *i.e.* under the conditions of commonest incidence in Holland.

Clinical description of all 12 cases is given, but no general recommendations are made for treatment although calcium injections, with or without glucose and magnesium injections (only 50 ml. of 10% magnesium sulphate) were generally tried. Mortality was 50%; the longer the interval between calving date and onset of the disease the worse was the prognosis.

—H. H. Green.

Palmer, L. S., Gullickson, T. W., Boyd, W. L., Fitch, C. P., & Nelson, J. W. (1941). **The Effect of Rations Deficient in Phosphorus and Protein on Ovulation, Estrous, and Reproduction of Dairy Heifers.**—*J. Dairy Sci.* **24.** 199–210.

Eleven grade Holstein calves and heifers were maintained over periods of 24–49 months upon a diet deficient in phosphorus and protein, a diet similar to that of cattle reared largely on prairie hay in a P-deficient region. Except for brief periods, and during lactation in the latter phases of the study, the animals consumed 5–8 g. of P and 0·4–0·75 lb. of digestible crude protein daily.

The majority of the animals grew at a subnormal rate and developed coarse coats, disproportionately large heads, and an emaciated appearance. They gradually passed into a state of chronic P deficiency as indicated by a subnormal P content of the blood plasma. Periodic balance trials indicated a relatively low percentage retention of N and P and in every case bone analysis revealed an abnormally low ratio of $Ca_3(PO_4)_2 : CaCO_3$.

Frequent regular examination was made for physical signs of menstruation in the young animals and for physical and psychological signs of oestrus. The time of ovulation was determined by noting the progressive and retrogressive changes of follicles and corpora lutea. The uterus, in addition to secreting large amounts of mucus exhibited marked muscular contraction at the time of oestrus. Whenever oestrus was noted, the inclination of the animals to "bull" other heifers was tested, but bulls were not employed at any time to determine the physiological activity of the sex organs.

In nine animals which were put on the deficient diet when still calves, sexual maturity, as judged by the first occurrence of ovulation and oestrus, was in all cases much delayed. These animals reached maturity at ages ranging from 15½–21 months. Thereafter ovulation but not oestrus continued to occur at normal intervals. No instance of retained corpus luteum was observed. Symptoms of oestrus were at times so slight as almost to escape detection and physiological evidence of this state was not always accompanied by apparent psychological signs. In the young heifers menstruation occurred much less frequently than did oestrus.

Eight of the nine animals were tested for breeding efficiency after being maintained on the deficient diet for periods ranging from 14–37 months. The reduction in efficiency noted in a previous study when P alone was deficient was not observed in these experiments.

The majority of the animals conceived at the first service and produced normal calves. Nevertheless the marked dystocia (mainly maternal) which occurred with four of the eight animals employed was probably largely due to the dietary deficiencies.

—A. L. Walpole.

Krupski, A., Uehlinger, E., & Almasy, F. (1940). Weitere Beitrag zur Frage gewisser abnormer Gliedmassenstellungen bei jungen Tieren der Braunviehrasse. VIII. Mitteilung. [**Abnormal Limb Postures of Young Swiss Brown Cattle. VIII**].—*Schweiz. Arch. Tierheilk.* **82.** 333–343. [For part VII, see *V. B.* **11.** 49].

Krupski, A., Almasy, F., Ulrich, H., & Tobler, F. (1940). Untersuchungen über den Kalzium-Magnesium-, Phosphor-Stoffwechsel bei weiblichen Zwillingskälbern der Braunviehrasse. IX. Mitteilung. [**Researches on the Calcium, Magnesium, and Phosphorus Metabolism of Female Twin Calves of the Swiss Brown Breed of Cattle. IX**].—*Schweiz. landw. Mh.* **18.** 261–281.

Almasy, F., Krupski, A., & Ulrich, H. (1940). Beitrag zur physikalischchemischen Aufklärung des Kalzium-, Phosphor-Stoffwechsels beim Rind. X. Mitteilung. [**Contribution to the Physico-Chemical Explanation of Calcium and Phosphorus Metabolism in Cattle. X**].—*Ibid.* 285–301.

Krupski, A., Uehlinger, E., & Almasy, F. (1941). Epiphysäre Osteoporose beim

Rind. XI. Mitteilung. [**Epiphyseal Osteoporosis in Cattle. XI**].—*Schweiz. Arch. Tierheilk.* **83.** 1–9.

KRUPSKI, A., UEHLINGER, E., & ALMASY, F. (1941). Osteoporose bei jungen Tieren der Braun- und Fleckviehrasse. XII. Mitteilung. [**Osteoporosis in Young Swiss Brown and Spotted Cattle. XII**]. —*Ibid.* 368–381.

VIII. Deformities of the forelegs are described in four calves ; in one case the limbs were bent at birth and the calf survived only two weeks ; in the others slight abnormalities became increasingly obvious until the animals were brought in for treatment. In two of the animals the amounts of Ca, P, and Mg in the blood were estimated and showed a normal range of values. At P.M. examination the calcification of the bones appeared to be good and no defects could be found in the musculature or nerve supply of the abnormal limbs. As in earlier studies there was no histological evidence of rickets or osteoporosis. Some irregularities were observed in the epiphyseal spaces and were considered to be due to unequal pressure owing to the abnormal posture or to partial failure of ossification, but no reason for the occurrence of abnormal limb postures has yet been traced.

IX. A metabolic study similar to that made previously by KRUPSKI *et al.* [*V. B.* **10.** 862.] was made on twin female calves, receiving milk only at first, with increasing supplements of hay, and finally hay only. Their total intakes of milk, hay, and water were measured and were similar as were their growth rates. Both calves developed pica when the diet had consisted solely of hay for some weeks but after $2\frac{1}{2}$ months on pasture they were again normal and the metabolism study was continued for a second season. Throughout the whole experiment the Ca and Mg content of the blood serum remained almost constant, but the P and phosphatase contents showed some variations and were more influenced by administration of vitamin D than the Ca and Mg values. Ca and P balance experiments over periods of seven days showed normal absorption when milk was the sole diet, but when hay was given the Ca absorption decreased and the Ca balance became negative when hay was given alone. After a summer on pasture the Ca, P, and Mg absorption was above the normal rate and was even higher after a second summer in the open. The value of fodder in maintaining Ca and P balance was dependent not so much on the actual mineral content as on the relative amounts of Ca and P present. Studies of acid-base balance and haematological tests proved normal for both animals.

X. Simple mathematical relations were examined for the Ca and P intake, excretion, and absorption of the twin calves in the study described in IX. The absorption of Ca and P was directly proportional to the P intake, but the Ca absorption was not related to the Ca intake. With increasing P intake there was a decrease in the ratio of Ca : P absorption. When the calves were eating hay only the excretion of Ca and P was proportional to the Ca intake and the Ca absorption decreased until the Ca balance became negative. After the calves had been on pasture for 2–3 months, the Ca and P absorption increased again in proportion to the intake of both minerals. The difference in Ca and P metabolism on hay and on grass was similar to that noted by other observers.

XI. A young bull which failed to grow and mature normally was killed, and although X-ray examination prior to slaughter had not revealed bone lesions and the Ca, P, and Mg content of the blood serum lay within normal limits, histological study of the bones showed severe osteoporosis in the epiphyses of all the long bones. The distal end of the epiphysis was always more affected than the proximal end and the deformity of the trabeculae was marked. The osteoporosis was limited to the spongiosa region of the epiphysis and is considered to be due to dietary imbalance of uncertain nature.

XII. The condition is described in five young animals with full details of macroscopic and histological findings. The bone changes resembled those observed in a previous case and differed from lesions occurring in rickets or in osteomalacia in cattle. Blood serum analyses were made in two cases and one showed marked hypocalcaemia and hyperphosphataemia, while the other had only slightly lowered blood Ca and normal blood P. The nature of the deficiency of minerals or of vitamins, or the failure of hormonal balance responsible for this type of osteoporosis still remains to be investigated.—A. M. COPPING.

CANNAVÒ, F. (1939). Su di una forma di malattia da carenza osservata nei bovini della Cirenaica. [**A Deficiency Disease**

of Cattle in Cyrenaica, Libya].—*Clin. vet., Milano.* **62.** 545–558.

Disinclination for movement was first noticed in March and April 1933 in two cows in a stall in the neighbourhood of Barce. Other cases amounting in all to about 30 were reported and from Benghazi also. Chiefly cows in milk but also bulls and young animals were affected. There was a tendency to improvement in summer with relapse in winter. Spontaneous fractures occurred. C. states that, except in chronic cases, useful therapeutic results were obtained with dietetic supplements and intravenous injections of $CaCl_2$.

The disease is attributed to disturbance of the mineral metabolism, and the aetiology of osteomalacia in cattle is discussed.—E. M. H.

LÜHRS, E. (1941). Untersuchungen über den Einfluss der Kalisalze auf die Entstehung der Lecksucht. [**The Influence of Potassium Salts on the Origin of Pica**].—*Arch. wiss. prakt. Tierheilk.* **76.** 340–351.

The aetiology of pica and acetonuria in cattle is reviewed with reference to mineral, carbohydrate, and protein metabolism, and the particular importance of potassium salts as regulators of cell metabolism.—A. M. C.

NICOLAISEN, W., & SEELBACH, W. (1938). Untersuchungen über die Kupfersulfatdüngung gegen Urbarmachungskrankheit und Lecksucht. [**The Use of Copper Sulphate as Fertilizer against "*Urbarmachungskrankheit*" in Plants and "*Lecksucht*" in Animals**].—*Forschungsdienst.* **5.** 383–387.

The abstracting of this paper involves some explanation since there are no precise equivalents in English for the words "*Urbarmachungskrankheit*" and "*Lecksucht*". The former word is applied to a disorder of crops associated with some obscure fault in plant metabolism and would be literally translated "bringing-into-cultivation-disease". The latter word would be literally translated "licking disease", the word "pica" being sometimes used although it has the broader meaning of "depraved appetite" and is therefore also associated with other disorders of entirely different origin, *e.g.* the osteophagia characteristic of aphosphorosis. In the present context the disorder is one affecting cattle in certain areas of Schleswig-Holstein and is characterized by general cachexia. The associated disease of plants is characterized by failure of certain root crops, and "deafness" or failure to develop grain in crops such as oats.

Application of about 1 cwt. of copper sulphate per acre banished both the *Urbarmachungskrankheit* of plants and the *Lecksucht* of animals consuming them. The weight of grain of oat and rye crops increased, particularly the former; exceptionally good results were obtained with maize; swedes developed normally and growing of sugar beet became possible; sweet lupins, which on untreated land developed no seed, gave normal crops after Cu manuring; pasture grass was visibly improved. Young cattle grew normally and cachectic cattle transferred from Cu-deficient pastures rapidly improved, with disappearance of symptoms of pica.

The Cu content of hay from affected areas ranged from 0·80 mg. % downwards, practically none being found in four out of 19 samples. Hay from apparently unaffected areas, however, sometimes showed only 0·1–0·7 mg. so that conclusions could not be drawn from analytical data alone. No blood Cu values are mentioned.

In discussing the literature, the authors point out that the failure of other investigators to incriminate Cu deficiency as cause of *Lecksucht* in other areas may merely mean that the malnutrition characteristic of the disease may have more than one origin.

[Although protocols in the form of weight records are not given in this paper the observations appear convincing. In general connexion with beneficial effects of Cu, the reduced incidence of "swayback" in lambs in Derbyshire, following a Cu supplement to the pregnant ewes, may be recalled. Yet no disease simulating *Lecksucht* has been described on the "swayback" pastures of Derbyshire, nor is any disease resembling "swayback" mentioned by the authors as occurring in Schleswig-Holstein.]—H. H. GREEN.

KJELDBJERG, J. (1940). Eklampsi hos soen. Dens Forekomst, Aetiologi, Patogenese og Terapi. [**Eclampsia in Sows**].—*Beretn. 5. nord. Vet.-møde, Kbh., 1939.* pp. 670–691. Discussion pp. 691–692. [German summary].

K. describes many years' observations on eclampsia in pregnant sows and discusses its nature and occurrence in comparison with eclampsia in women. K. estimates, on the

basis of his own 20 cases occurring in 600 herds, that about 700 cases occur annually in sows in Denmark. The condition occurs at all times of the year and is more common in multiparous sows, while the bearing of litters over the average size appears to predispose to it. Half of all cases occur at, or close to, farrowing time, one-third some time beforehand and the remainder after parturition.

The theories on the cause of eclampsia are discussed together with concomitant urine and blood changes, which give no support to the theory that uraemia or kidney injury is concerned.

On examining blood for calcium, however, it was found that the type of eclampsia in sows which is accompanied by coma is characterized by a Ca content of 3–4 mg.%, whilst in that accompanied by convulsions instead of coma the blood Ca is 6–7 mg.%. The normal Ca content for pregnant normal sows was found to be 10·5 mg.%.

This finding made it clear that the disease known as eclampsia in sows is analogous to "milk fever" in cows and that a better name would be paresis puerperalis suis. Treatment with 60–100 g. $CaCl_2$ intravenously and 15–20 g. Ca gluconate (10–20%) subcutaneously with some luminal as a sedative gave good results, so that the previous high mortality was reduced to less than 10%.

In the discussion CHRISTENSON (Sweden) substantiated K.'s claim for the value of calcium therapy.—J. E.

GRAHAM, R., SAMPSON, J., & HESTER, H. R. (1941). **I. Acute Hypoglycemia in Newly Born Pigs. (So-called Baby Pig Disease).**—*Proc. Soc. exp. Biol., N.Y.* **47.** 338–339.

A preliminary report of a highly fatal condition which has been reported during the past eight years in Illinois. Outbreaks are sporadic and may involve from one to almost all of the litters in the herd. The condition is sometimes present at birth, but usually it appears from 24–48 hours of age. Affected piglets exhibit shivering, dullness, inappetance, and roughness of the coat, and often emit a weak squeal: death usually occurs in a coma within 24–36 hours of the first symptoms. There are no macroscopic lesions and attempts to transmit the disease have proved negative. Blood Ca, inorganic P, and total ketone bodies appear to be within the normal range, but there is a marked hypoglycaemia. The blood-sugar level of cases so far investigated has ranged from 3–61 mg. per 100 ml., and in one series of 20 affected piglets the mean value was only 26 mg. per 100 ml., compared with a mean of 113 mg. in normal controls of the same age. A few trials have indicated that glucose therapy may be effective in early stages of the disease.

As far as is known, the maternal diets and management have been normal in the cases investigated.—A. N. WORDEN.

DRYERRE, H., & ROBERTSON, A. (1941). **The Effect of Pregnancy on Tissue Lipides in the Ewe.**—*J. Physiol.* **99.** 443–453.

Analysis of specimens from 90 pregnant and 25 non-pregnant ewes showed that fatty infiltration of the liver was quite common in healthy pregnant individuals, the lipide content of the moist liver ranging from 4·3–19·5% with an average of 10% for pregnant animals, as against 4·3–8·7%, with an average of 6% for non-pregnant animals. Little variation in lipides occurred during the first two months of gestation, but thereafter the value rose rapidly, reaching a maximum about the end of the fourth month (average 12%) and then remaining comparatively constant until the end of pregnancy. The increase was mainly in the neutral fat fraction, associated with a marked fall in iodine value of the total fatty acids present. There appeared to be no correlation between liver fat, growth of foetus, or number of foetuses. Liver specimens from a few castrated male sheep showed lipoid content similar to that of ewes in late pregnancy and specimens from a few cases of pregnancy toxaemia in ewes showed lipoid values little different from those of clinically healthy sheep at a similar stage of pregnancy.

The data are discussed in relation to the ketosis of pregnancy toxaemia, which is interpreted as a disturbance of carbohydrate metabolism at a time when the liver has already undergone fatty infiltration, possibly as a result of over-production of the "fat metabolism hormone" by the anterior pituitary during late pregnancy.—H. H. GREEN.

I. GRIFFITH, W. H. (1941). **Choline Metabolism. V. The Effect of Supplementary Choline, Methionine and Cystine and of Casein, Lactalbumin, Fibrin, Edestin and Gelatin in Hemorrhagic Degeneration in Young Rats.**—*J. Nutrit.*

21. 291–306. [For part IV, see *V. B.* **11.** 626].

II. Griffith, W. H., & Mulford, D. J. (1941). **Choline Metabolism. VI. Hemorrhagic Degeneration and the Labile Methyl Supply.**—*J. Amer. chem. Soc.* **63.** 929–932.

III. Griffith, W. H., & Mulford, D. J. (1941). **Choline Metabolism. VII. Some Dietary Factors Affecting the Incidence and Severity of Hemorrhagic Degeneration in Young Rats.**—*J. Nutrit.* **21.** 633–646.

IV. Blumberg, H., & McCollum, E. V. (1941). **The Prevention by Choline of Liver Cirrhosis in Rats on High Fat, Low Protein Diets.**—*Science.* **93.** 598–599.

V. Engel, R. W., & Salmon, W. D. (1941). **Improved Diets for Nutritional and Pathologic Studies of Choline Deficiency in Young Rats.**—*J. Nutrit.* **22.** 109–121.

I. Studies on the aetiology of "haemorrhagic degeneration" in young rats were continued. The condition could be reproduced consistently on diets low in choline and containing less than 0·8% of methionine. Addition to the diet of over 0·8% of methionine, either as casein or other protein or as the pure substance, almost completely prevented the condition, as did the addition of 0·375% or more of choline chloride. The addition of cystine to a diet low in choline and methionine aggravated the condition, and it is suggested that this was due to an improvement in nutritional status with a consequential increased demand for methionine and choline. Renal hypertrophy occurred in rats which received high levels (18% and 22% respectively) of casein or gelatin, despite the presence of adequate methionine to prevent haemorrhagic degeneration.

II. Betaine hydrochloride, incorporated in the diet at the level of 0·2%, prevented the development of haemorrhagic degeneration on a diet low in choline and methionine, and may presumably replace choline as a source of methyl groups for metabolic processes. Creatine reduced the severity of the condition, but did not prevent it, when fed at levels up to 1% of the diet, and it is suggested that it may exert a sparing action by rendering available those methyl groups which would otherwise be needed for creatine synthesis. Cysteine, homocystine, and glutathione, but not taurine, were found to act as did cystine in aggravating the condition.

III. Haemorrhagic degeneration could be prevented by restriction of the food intake even when the diet was low in choline and methionine, and therefore a dietary supplement which increases food intake, and at the same time increases the severity of the condition (or of liver-fat deposition), is not necessarily directly antagonistic to choline.

The condition was accompanied by a marked rise in total blood non-protein-nitrogen: pooled samples gave values up to 250 mg. N.P.N. per 100 ml. blood. Survival and repair, with subsequent resumption of body growth, depended upon the severity of the condition. Various vitamin supplements were without influence on the course of the disease, but it is stated that nicotinic acid had a slightly aggravating effect, which is explained on the basis of trigonelline formation. [Trigonelline is the form in which nicotinic acid is excreted in the urine.]

IV. Piebald rats, which were half- to almost full-grown at the commencement, developed cirrhosis of the liver in 100–150 days when fed on purified diets high in fat, low in protein, and deficient in choline. The livers of control animals which had received 1% choline chloride in their diets remained normal.

V. Severe clinical symptoms and pathological changes were produced in young rats by feeding them on choline-deficient diets, of which the most effective consisted of peanut meal, casein, sucrose, minerals, and various vitamin supplements. The condition could be prevented by feeding 10–20 mg. of choline chloride per rat per day.

The symptoms, which developed within 6–10 days in animals of either sex, included drowsiness, marked enlargement of the kidneys, and abdominal distention. A pooled sample of blood contained nearly 250 mg. per 100 ml. of non-protein-nitrogen, or over five times that of a control sample. A variety of histopathological changes, including a marked increase in the visible liver fat, were found on P.M. examination.—A. N. Worden.

Schaefer, A. E., McKibbin, J. M., & Elvehjem, C. A. (1941). **Importance of Choline in Synthetic Rations for Dogs.**

—*Proc. Soc. exp. Biol., N.Y.* **47.** 365–368.

It has previously been shown [*V.B.* **11.** 472.] that the addition of vitamin B_1, riboflavin, nicotinic acid, vitamin B_6, and pantothenic acid to a basal vitamin-B deficient diet did not permit the survival of young dogs. It is now reported that the further addition of choline, at the rate of 100 mg. per kg. body weight daily, produced an immediate growth response in puppies. Addition of 50 mg. choline per kg. body weight daily did not, however, produce optimum growth, and it appears that other essential growth-promoting substances for dogs must be present in liver.

There was a high incidence of yellow livers in choline-deficient animals, and the deficiency syndrome, which included anorexia, was sudden in onset.—ALASTAIR N. WORDEN.

LOWRY, J. V., DAFT, F. S., SEBRELL, W. H., ASHBURN, L. L., & LILLIE, R. D. (1941). **Treatment of Dietary Liver Cirrhosis in Rats with Choline and Casein.**—*Publ. Hlth Rep., Wash.* **56.** 2216–2219. [Authors' summary copied *verbatim*].

Rats with liver cirrhosis produced on a low choline, low casein diet with added cystine showed marked improvement in the gross appearance of the liver and hyperplastic regeneration of liver cells following treatment with choline, a high casein diet, or choline with a high casein diet. There was no recognizable effect on the fibrous tissue.

KLOSE, A. A., & ALMQUIST, H. J. (1941). **Methionine in the Diet of the Chick.**—*J. biol. Chem.* **138.** 467–469.

Methionine was shown to be an essential growth factor for young White Leghorn chicks in a series of experiments in which the basal diets comprised about 60% carbohydrate, 20% arachin [a protein obtained from peanuts], and various vitamin, mineral, and amino-acid supplements. At least 1% methionine appeared to be necessary for optimum growth. A combination of homocystine and choline could replace methionine, but single supplements of cystine, homocystine, or creatine were ineffective.—ALASTAIR N. WORDEN.

ALMQUIST, H. J., STOKSTAD, E. L. R., MECCHI, E., & MANNING, P. D. V. (1940). **Identification of the Rice Factor.**—*J. biol. Chem.* **134.** 213–216.

Experiments are described which demonstrate that glycine and chondroitin are necessary for the optimum growth of chicks. A combination of these two substances produced a rate of growth equal to that obtained in chicks on a cartilage-supplemented diet or on a rice-supplemented diet. From these results it appears that the rice factor can be identified with, or replaced by, a mixture of glycine and chondroitin.—R. ALLCROFT.

HEGSTED, D. M., HIER, S. W., ELVEHJEM, C. A., & HART, E. B. (1941). **The Growth Factors in Cartilage for the Chick.**—*J. biol. Chem.* **139.** 863–869.

The growth rate of young White Leghorn chicks was substantially improved, and the severity of gizzard erosion reduced, when their basal diet containing 18% casein and 5% yeast was supplemented by 15% cartilage, or by 0·5–1·0% arginine in combination with 1% glycine, and either 5% chondroitin or 1% arabinose or xylose. The arginine could be replaced by increasing the casein to 30%, and chondroitin did not augment growth further when the yeast was increased to 10%. Arginine produced a slight increase only and glycine and chondroitin none at all, when used as single supplements. These results confirm and extend the findings of ALMQUIST *et al.* [see preceding abst.] and also suggest that the requirements of the chick for arginine are very high.—A. N. W.

MELLANBY, E. (1941). **Skeletal Changes Affecting the Nervous System Produced in Young Dogs by Diets Deficient in Vitamin A.**—*J. Physiol.* **99.** 467–486.

M. recently demonstrated [*V.B.* **10.** 197.] that certain nerve degenerations are caused by pressure due to overgrowth of adjacent osseous structures, and in the present communication he states that all or nearly all of the bones in the body are affected by vitamin A deficient diets.

A detailed and illustrated description is given of the gross changes of the cranium and spinal column of puppies which had received a diet deficient in vitamin A and carotene from 7–10 weeks of age. The original should be consulted for the anatomical and histological details of the changes which bring about compression of the brain and spinal nerves and, in advanced cases, an increase of intracranial pressure; the pressure of the cerebrospinal fluid in the A-deficient dogs was sometimes

nearly double that of normal animals [see also MOORE & SYKES—*V. B.* **11.** 184].

M. suggests that vitamin A probably functions by limiting the activity of osteoblasts and osteoclasts, thus permitting the proliferation of cancellous at the expense of compact bone. The total Ca content of bones from A-deficient and normal control animals was the same.

—ALASTAIR N. WORDEN.

SCHOUR, I., HOFFMAN, M. M., & SMITH, M. C. (1941). **Changes in the Incisor Teeth of Albino Rats with Vitamin A Deficiency and the Effects of Replacement Therapy.**—*Amer. J. Path.* **17.** 529–562.

This paper comprises a detailed and well illustrated account of experiments which confirm and extend the results of earlier workers, and which are of interest to the specialist. The gross changes in the morphology of incisors of rats on vitamin A deficient diets are explained by the fact that differentiation of the odontogenic epithelial tissue is incomplete, although this tissue continues to proliferate, and that there is subsequent interference with the normal rate of apposition of dentin.

The normal histophysiology of the rat incisor is described.—ALASTAIR N. WORDEN.

BECK, S., & PEACOCK, P. R. (1941). **Gastro-Papillomatosis Due to Vitamin A Deficiency Induced by Heated Fats.**—*Brit. med. J.* July 19th. 81–83.

Fibiger (1913) described the experimental production of neoplasms in the fore-stomachs of rats which were said to have ingested cockroaches containing the nematode, *Gongylonema neoplasticum*, and it is pointed out here that the diet of the rats was deficient in vitamin A and other factors and that this may have accounted for the neoplasms. The authors found that ulceration and papillomatosis of the fore-stomach could be induced in rats by feeding them for some months on a normal basal diet to which repeatedly heated lard, cottonseed oil, or other fat had been added, but in one animal only did a malignant neoplasm develop. Control animals receiving unheated lard, or heated fat together with carrots as a rich source of vitamin A, remained normal. The liver vitamin A reserves of rats which had received a heated fat diet were lower than those of controls. From these results it appears that the occurrence of papillomatosis was related to an induced avitaminosis-A due to the presence in repeatedly heated fats of a factor which interferes with the absorption or metabolism of vitamin A.—ALASTAIR N. WORDEN.

WIELAND, W. (1940). Rachitis bei Ziegen. **[Rickets in Goats].**—*Tierärztl. Rdsch.* **46.** 522–523.

A brief annotation is given describing the occurrence and symptoms of rickets in goats. The condition was treated by improvement of the diet to include hay, oats, beans, bran, and supplements of bone meal, calcium phosphate, and cod liver oil, as a source of vitamin D. The sick animals were housed singly in well lighted stalls.—A. M. COPPING.

MACKENZIE, C. G., MACKENZIE, J. B., & MCCOLLUM, E. V. (1941). **A Prevention by Alpha-Tocopherol of "Cod Liver Oil Muscular Dystrophy" in the Rabbit.**—*Science.* **94.** 216–217.

It was previously shown [*V. B.* **12.** 49.] that cod liver oil fed shortly after administration of α-tocopherol counteracts the beneficial effect of the vitamin upon muscular dystrophy in rabbits. It is now shown that the antagonistic action of the cod liver oil may be overcome by the administration of very much larger doses of α-tocopherol.—ALASTAIR N. WORDEN.

ALMQUIST, H. J. (1941). **Vitamin K.**—*Physiol. Rev.* **21.** 194–216.

The distribution of the vitamin in plants, micro-organisms, and tissues is discussed and biological methods of estimation are reviewed. The physiology and the importance of vitamin K in the prevention of haemorrhagic disorders is dealt with and it is pointed out that little is known about the manner in which vitamin K promotes the formation of prothrombin. The chemistry and synthesis of the vitamin and related antihaemorrhagic compounds are described.—R. ALLCROFT.

GREEN, R. G., CARLSON, W. E., & EVANS, C. A. (1941). **A Deficiency Disease of Foxes Produced by Feeding Fish. B_1 Avitaminosis Analogous to Wernicke's Disease of Man.**—*J. Nutrit.* **21.** 243–256.

A more detailed account is given of the occurrence of a deficiency disease identified as Chastek paralysis [see *V. B.* **11.** 629 and 892.] which occurs in foxes fed a diet containing 10% or more of fresh fish. The disease was produced experimentally in a group of foxes given a diet containing fresh carp and was prevented by adding large amounts of thiamin to the same

diet. It is concluded that the disease is definitely due to avitaminosis B_1, but how fish can induce such a deficiency is not known; it is suggested that fresh fish may contain some substance which causes an inactivation or destruction of the vitamin.—R. ALLCROFT.

LANDY, M., & DICKEN, D. M. (1941). **Biotin Synthesis by Microörganisms.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 449–452.

It is shown that a large variety of bacterial species and several moulds can synthesize biotin when grown in a completely synthetic biotin-free medium. This suggests that biotin may be of importance in microbial nutrition. —R. ALLCROFT.

SANDZA, J. G., & CERECEDO, L. R. (1941). **Requirement of the Mouse for Pantothenic Acid and for a New Factor of the Vitamin B Complex.**—*J. Nutrit.* **21.** 609–615.

Pantothenic acid, in the form of daily subcutaneous injections of *d*-calcium pantothenate, was shown to have a marked growth-promoting effect upon young mice already receiving a basal synthetic diet supplemented by vitamins B_1 and B_6, riboflavin, and an alkali-treated liver extract. Better performances were recorded, however, when the alkali-treated liver + pantothenic acid were replaced by an untreated liver extract. Mice therefore appear to require an as yet undetermined alkali-stable factor, while the possibility that they may require an alkali-labile factor other than pantothenic acid is not excluded by these experiments.—ALASTAIR N. WORDEN.

WOOLLEY, D. W. (1941). **Identification of the Mouse Antialopecia Factor.**—*J. biol. Chem.* **139.** 29–34.

The alopecia previously described as occurring in mice on a purified diet could be cured by the addition of phytin [inositol hexaphosphoric acid] or of inositol itself to the basal diet [see also *V. B.* **11.** 633.], and inositol was recovered from liver fractions which had been shown to be curative.

The severity of the alopecia was considerably lessened when the amount of sodium pantothenate in the basal diet was increased. —ALASTAIR N. WORDEN.

WOOLLEY, D. W. (1941). **Relationship of Pantothenic Acid and Inositol to Alopecia in Mice.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 565–569.

When mice were maintained on a purified diet containing inositol but no pantothenic acid, growth was retarded and the animals became irritable; later their hindquarters were affected and more or less complete paralysis of the hind legs ensued. A few days after the appearance of these symptoms alopecia developed from the ventral surface of the body; occasionally alopecia developed without the nervous and muscular symptoms. Administration of pantothenic acid resulted in a return to normal, but the effect on the alopecia was much slower than on the other symptoms. When pantothenic acid was given without inositol, alopecia developed quickly but without manifestation of the nervous and muscular symptoms. Addition of inositol resulted in regeneration of the growth of hair within ten days. Animals which received both inositol and pantothenic acid grew more rapidly than those which received pantothenic acid only. From these results it appears that both inositol and pantothenic acid are essential for the normal growth of hair in mice.—R. ALLCROFT.

OLESON, J. J., BIRD, H. R., ELVEHJEM, C. A., & HART, E. B. (1939). **Additional Nutritional Factors Required by the Rat.**—*J. biol. Chem.* **127.** 22–42.

Four different deficiency symptoms were produced in rats maintained on synthetic diets low in the vitamin B complex but containing adequate thiamin, riboflavin, choline, and nicotinic acid; the symptoms were acrodynia, paralysis, haemorrhagic disease, and "spectacled eye condition". This last symptom is so called because of an erosion about the eyes which gives a spectacled appearance to the rats. The lids became denuded and scaly and in many cases were closed by a sticky exudate. Addition of crystalline vitamin B_6 to the diet prevented the acrodynia but did not prevent the other three conditions. The relation of these deficiencies to known members of the vitamin B complex is discussed and further evidence is given of the need of factor W for growth.—R. ALLCROFT.

PAVCEK, P. L., & BAUM, H. M. (1941). **Inositol and Spectacled Eye in Rats.**—*Science.* **93.** 502.

The addition of 10 mg. inositol per rat daily cured the "spectacled eye condition" [see preceding abst.] which developed in rats maintained on a basal diet deficient in vitamin

B_6. An increase in growth rate was also observed when inositol was given.—A. N. W.

LAVOLLAY, J., & NEUMANN, J. (1941). La fonction vitaminique P. Action chimique, pharmacodynamique et physiologique de substances naturelles inhibant l'autoxydation de l'adrénaline. **[The Function of Vitamin P]**.—*C. R. Acad. Sci., Paris.* **212.** 251–253.

The authors suggest that vitamin P controls capillary permeability *via* adrenalin, by affecting the tone of the arterioles or venules. Highly purified extracts of oranges were shown to inhibit the auto-oxidation of adrenalin, and to preserve it in physiologically active form. Three polyphenolic glucosides of vegetable origin, including quercitrin, also possess this property. Such vegetable extracts considerably prolong the inhibiting action of adrenalin on the intestinal muscle of the g. pig and its contractile effect on the seminal vesicles. Previous intravenous injection of quercitrin prolonged the effect of an injection of adrenalin in a dog under chloral narcosis. When this was followed by an injection of peptone, the only manifestation of shock was a slight transitory lowering of the blood pressure.

Such substances, derived from food, maintain a certain active concentration of adrenalin in the circulation and so guard against vascular collapse and shock.—J. P. GARDNER.

PHYSIOLOGY

I. ELY, F., & PETERSEN, W. E. (1941). **Factors Involved in the Ejection of Milk.**—*J. Dairy Sci.* **24.** 211–223.

II. MILLER, K., & PETERSEN, W. E. (1941). **Some Factors Involved in Efficient Milking.**—*Ibid.* 225–233.

I. In reviewing the literature dealing with the factors involved in the ejection of milk, the authors find that the majority of investigators have failed to differentiate between the processes involved in the secretion of milk within the gland and the act of ejecting the milk from the alveoli and the small ductules. In this paper data are presented describing a series of experiments in which Jersey cows were subjected to fright stimuli and intrajugular injections of adrenalin (1 : 1,000), pitocin (oxytocic principle of posterior pituitary, 1 : 100) and pitressin (pressor principle of posterior pituitary, 1 : 100). The left half of the udder of three of these cows had been denervated, and the response of this half of the gland was compared with the right or intact half in terms of the rate of ejection of milk. On the basis of their experimental data the authors summarize their conclusions as follows.

(1) Denervating the gland during the dry period resulted in no effect on the rate of ejection of milk during the subsequent lactation. There was also no change in the appearance of the two halves of the udders following the operation. This is additional evidence that the act of milk ejection is not under the direct control of the central nervous system.

(2) Fright and intrajugular injections of adrenalin resulted in the cessation of milk ejection. The amount of adrenalin injected seems to determine the length of time that must elapse before natural ejection is possible. Other symptoms of adrenalin shock were a hard udder, refusal of food, trembling, and other signs of a severe nervous shock.

(3) Intravenous injections of 4 ml. of either pitocin or pitressin caused the gland to be more completely drained than would be the case with a normal complete milking. This was also the case when the injection of these posterior pituitary fractions followed fright or adrenalin injections, or was made at the end of a normal complete milking.

(4) When a smaller dose was used, " pitocin" showed greater potency in inducing prompt resumption of rapid ejection than " pitressin ". This seems to indicate that the effect of pitressin may be due to pitocin contained in it.

(5) The extra or residual milk removed from the udder, following the injection of pitocin, varied from normal composition chiefly in the greatly raised percentage of butter fat, which ranged from 7·6% to 24·0% in a series of experiments.

The authors formulate the following new theory, based on the results of their work, to explain the " holding up " and " letting down " of milk. The positive act of " letting down " milk is a conditioned reflex stimulated by palpation of the teat, rattling of milk buckets, washing of the udders, etc. These stimuli cause afferent impulses to reach the central nervous system which, in turn, stimulates the

posterior lobe to secrete oxytocin into the blood, and it is this which is believed to be largely responsible for the increase in intra-glandular pressure, which literally squeezes the milk from the alveoli and smaller ductules. On the other hand, fright stimuli reflexly stimulate the natural production of adrenalin, and it is the presence of an increased amount of adrenalin in the blood which prevents the muscular contractions which are responsible for high intra-glandular pressure. The authors admit that evidence as to the existence of the musculature surrounding the alveoli and small ductules is only circumstantial, but claim that it is nevertheless quite convincing.

II. According to work recorded in I, the milking act is the normal stimulus which causes the secretion of oxytocin into the blood, which in turn causes a contraction of the mammary gland musculature to force the milk out of the alveoli into the larger channels of the gland. On the basis of this concept, the authors have examined the practical significance of the muscular contraction theory of milk ejection in relation to the effect of different milking procedures. The results of the investigations described by the authors are summarized as follows.

(1) Delayed stripping, 15 min. after the cessation of milking, has little or no effect on milk and butter fat production.

(2) Manipulation of the udder by washing and preliminary stripping 20 min. before milking begins causes an appreciable decrease in milk and especially fat production.

(3) When individual quarters are milked successively, there is a progressive decrease in the amount of milk and fat from individual quarters.

(4) That the progressive decrease in amounts of milk and fat of successively milked quarters is not due to lowered secretion of milk but to failure to completely "let down" the milk is proven by the expulsion of the milk from the udder after the injection of pitocin (oxytocic principle).

(5) Proof is furnished that rapid milking is conducive to large milk flow.

(6) The reason for lowered production from manipulation of the udder some time before milking and from a prolonged milking process is tentatively explained as being due to a dissipation of the oxytocic principle in the blood.

—N. J. Scorgie.

Foust, H. L. (1941). **The Surgical Anatomy of the Teat of the Cow.**—*J. Amer. vet. med. Ass.* **98.** 143–149.

A detailed description of the anatomical features of the teat and teat canal in the cow, well illustrated by photographs and diagrams. No new facts are given.—N. J. Scorgie.

Roets, G. C. S. (1940). **Chemical Blood Studies VIII. A Rapid Spectroscopic Method for (A) The Quantitative Determination of Haemoglobin in Blood and (B) Its Application for the Quantitative Estimation of Haemoglobin in Milk, Urine, Serum or Plasma and Faeces.**—*Onderstepoort J. vet. Sci.* **14.** 451–458. [For part VII, see *V. B.* **8.** 811].

The haemoglobin present in the biological material is brought into a solution which, for the purpose of the determination, must be translucent. The haematin of the haemoglobin molecule, present in such a solution, is converted into pyridine haemochromogen and the 555 spectroscopic absorption band compared, by the principle of dilution, against that of a known standard prepared from haemin. This method is especially useful for the examination of biological materials for clinical purposes. Haemoglobin quantities of 0·4 mg. per 100 ml. can be easily detected.—E. M. Robinson.

Allcroft, W. M., & Folley, S. J. (1941). **Observations on the Serum Phosphatase of Cattle and Sheep.**—*Biochem. J.* **35.** 254–266.

Over 900 serum phosphatase values were obtained from blood samples from 240 ewes and lambs and 294 cows; all the animals were apparently normal and it was hoped to establish the limits of probable variation in the normal animal in order to assess the possible value of the serum phosphatase level in the diagnosis of disordered Ca and P metabolism. The normal serum phosphatase varied from 0·3–114·3 units per 100 ml. serum in the cow, and from 3·0–166·1 units per 100 ml. serum in the ewe. The cows examined were from nine herds representing five dairy breeds and one beef breed; the Dairy Shorthorn breed showed a wider range of values than the others. Wide differences occurred from animal to animal, but in adult cows and ewes the level for each animal was approximately constant over long periods of time. The levels were higher in young animals, there being a progressive decrease

with advancing age up to maturity. No correlation was obtained between the serum phosphatase and the milk capacity or stage of pregnancy of dairy cows. Because of the very wide variations, it is concluded that serum phosphatase estimations can be of very little diagnostic value in the ruminant.—F. A.

ROBERTSON, O. H. (1941). **Phagocytosis of Foreign Material in the Lung.**—*Physiol. Rev.* **21.** 112–139.

A review of the literature shows that while the process of phagocytosis represents the most effective means possessed by the body for the disposal of foreign matter which has penetrated into the terminal areas of the lung, it fails in many cases to protect the body against the noxious effects of such extraneous material. This is particularly true of those substances which are not susceptible to the action of the digestive enzymes of the phagocytic cells. Thus the transfer by the macrophages of irritating dusts (silicates) and lipoid material from the alveoli to the parenchymatous tissue may ultimately result in greater injury to the lung than if the foreign substances had remained in the air sac.

The protection afforded by phagocytosis is much more effective against bacteria than against inorganic matter, for the phagocytic cells possess enzymes capable of digesting most bacteria. The neutrophilic leucocytes (polymorphs) are the first phagocytic cells to be mobilized at the site of infection and constitute the body's first line of defence; later the more slowly accumulating macrophages take over the function of phagocytosis and digestion. The role played by the macrophage in the process of recovery from infectious diseases is reviewed in some detail.—F. AYLWARD.

KWIATKOWSKI, H. (1941). **Observations on the Relation of Histamine to Reactive Hyperaemia.**—*J. Physiol.* **100.** 147–158.

Estimations made of the histamine content of the venous blood of man and rabbits during a state of reactive hyperaemia, showed that the concentration was not significantly above that in normal blood. It was also demonstrated that while the administration of cysteine annulled the action of injected histamine on the blood pressure of the cat, it did not modify the fall of blood pressure following reactive hyperaemia. No evidence was therefore obtained for the view that some of the symptoms of reactive hyperaemia are due to absorbtion into the circulation of histamine from the limb.—F. A.

DUCKWORTH, J., & GODDEN, W. (1941). **The Lability of Skeletal Magnesium Reserves. The Influence of Rates of Bone Growth.**—*Biochem. J.* **35.** 816–823.

Further studies on the mobilization of Mg from the skeleton [see also *V. B.* **10.** 455.] were made on rats whose rate of bone growth was altered by adjustments of the Ca intake while they were maintained on a diet acutely deficient in Mg but adequate in all other constituents. The diets given to four groups of newly weaned rats contained 0·9, 0·3, 0·1, and 0·0001% Ca respectively. The survival period was lengthened by a reduction in the Ca intake. The complete skeleton (except for paws, sternum, and teeth) of all animals was analysed for total ash and Mg content. From these data it was found that the net amount of Mg liberated from the skeleton and its apparent rate of mobilization were related to the bone growth. The distribution of Mg in the body is discussed and the conclusion reached that bone constitutes the main reserve of Mg in the body and that this Mg is highly labile. The two-phase nature of the syndrome of Mg deficiency can be explained on the basis of mobilization and then cessation of mobilization of the skeletal reserves. A suggested mechanism for the removal and return of skeletal Mg is propounded.—ALFRED EDEN.

PERRY, M. W., & ARMSTRONG, W. D. (1941). **On the Manner of Acquisition of Fluorine by Mature Teeth.**—*J. Nutrit.* **21.** 35–44.

The fluorine content was estimated of the femurs and of the dentin and enamel of incisor and molar teeth of ten rats whose drinking water was supplemented with 20 p.p.m. of F, and of nine control rats receiving no F supplement. The dentin of the molars of the control rats contained more F than the enamel, but the F content of the dentin was not increased in the group receiving the F supplement. Reverse results were obtained in the incisor teeth. From these results it seems probable that the higher F content of the enamel of the molars was due to absorption of F from the oral cavity through the surface of the enamel. Therefore it appears that a secondary F enrichment of teeth like rat molars which remain anatomically unaltered after eruption does occur at some stage after calcification.—R. ALLCROFT.

WATSON, R. H., & JARRETT, I. G. (1941). **Studies on Deglutition in Sheep: A Résumé of Observations on the Influence of Copper Salts on the Course Taken by Liquids into the Stomach of the Sheep.** —*Aust. vet. J.* **17.** 137–142.

The passage of liquid direct to the abomasum is facilitated if copper sulphate in solution be administered *per os* immediately prior to the liquid: this results in response of the oesophageal groove mechanism to chemical stimulation. Copper acetate and cupric chloride solutions have similar effects. The influence of solutions of copper salts does not arise from their astringency or pH, it cannot be attributed to the anions of the salts, and is unlikely to be due to osmotic effects. Various concentrations of $CuSo_4$ solution evoke response of the oesophageal groove mechanism, but the response tends to persist longer when more concentrated solutions are used (0·08 *M* and 0·40 *M* solutions were used in these tests). A response is usually evoked when 2 ml. of solution are carefully administered into the mouth, but the response frequently does not persist as long as when 10 ml. of solution are given. The response may not occur for some seconds after the delivery of $CuSO_4$ into the mouth, but the delay is not more than 8 sec. in most instances.

The course taken by liquid administered *per os* shortly after $CuSO_4$ solution varies greatly with individual sheep: it almost always passes either completely or largely to the abomasum, but in some sheep this only occurs irregularly.—H. McL. GORDON.

TORRANCE, C. C. (1940). **The Ascorbic Acid Concentration of Inflammatory Lesions of the Skin.**—*J. infect. Dis.* **67.** 53–58.

Inflammatory lesions were produced in the skins of g. pigs, rabbits, and rats by injection of diphtheria toxin and by the application of heat; the vitamin C concentration of samples of skin from the lesions was estimated and compared with similar samples from corresponding uninjected and uninflamed areas on the opposite side of the body. A significant reduction was found in the ascorbic acid concentration of the skin from the inflamed areas when compared with that of the normal skin. No such changes were observed in the skin of rats after injections of toxin insufficient to cause any inflammatory reaction in this species of animal. These results indicate that the changes in the ascorbic acid content of the skin are associated with inflammatory lesion and are not caused by the presence of the toxin. It is suggested that the total amount of ascorbic acid in a local lesion may affect capillary permeability and thus the oedema.—R. ALLCROFT.

FRANK, R. T., GOLDBERGER, M. A., & FELSHIN, G. (1940). **Clinical and Laboratory Investigations of some of the Newer Sex Hormone Preparations.**—*Endocrinology.* **27.** 381–384.

The clinical effect of stilboestrol, pregneninolone, concentrates of pregnant mare serum, and ethinyl oestradiol were studied on human patients; excretion of the hormones after therapy was observed.—J. M. ROBSON.

POISONS AND POISONING

MAREMONTI, F. (1939–40). Lewisite. Studio sperimentale delle lesioni anatomo-patologiche da intossicazioni acute e croniche ottenute mediante applicazione sulla cute. [**Toxic Action of Lewisite on the Skin**].—*Riv. milit. Med. vet., Roma.* **2.** 268–283, 437–460, and **3.** 16–40.

M. applied lewisite in varying amounts to the depilated skin of dogs. Fatal amounts produced hyperaemia and oedema of the lungs, stomach, duodenum, large intestine, liver, and kidneys. The liver and kidneys underwent degenerative and necrotic changes, the changes in other organs being of varying severity.

In animals which received non-lethal amounts, no permanent pathological changes could be found when the animals were destroyed a considerable time after the application.

The skin, at the point of application of lewisite, underwent processes of inflammation and necrosis but the sebaceous glands and hair follicles proved very resistant. Animals varied in their individual resistance to the poison. In most cases death was caused by pulmonary oedema although in some cases degeneration of the myocardium was a marked feature.

—MILLER WATSON.

CAMPBELL, H. A., SMITH, W. K., ROBERTS, W. L., & LINK, K. P. (1941). **Studies**

on the Hemorrhagic Sweet Clover Disease. II. The Bioassay of Hemorrhagic Concentrates by Following the Prothrombin Level in the Plasma of Rabbit Blood.—*J. biol. Chem.* **138.** 1–20. [For part I, see *V. B.* **11.** 464. Part III untraced].

CAMPBELL, H. A., & LINK, K. P. (1941). **Studies on the Hemorrhagic Sweet Clover Disease. IV. The Isolation and Crystallization of the Hemorrhagic Agent.** —*Ibid.* 21–33.

STAHMANN, M. A., HUEBNER, C. F., & LINK, K. P. (1941). **Studies on the Hemorrhagic Sweet Clover Disease. V. Identification and Synthesis of the Hemorrhagic Agent.**—*Ibid.* 513–527.

HUEBNER, C. F., & LINK, K. P. (1941). **Studies on the Hemorrhagic Sweet Clover Disease. VI. The Synthesis of the δ-Diketone Derived from the Hemorrhagic Agent through Alkaline Degradation.**—*Ibid.* 529–534.

II. Details are given of a method for estimating the prothrombin level in rabbit plasma; the method is used for determining the relative prothrombin-inactivating powers of spoiled sweet clover hay and concentrates prepared from it. As rabbits vary greatly in their susceptibility to the haemorrhagic agent in spoiled sweet clover hay, it is essential that only susceptible rabbits should be used for assay. The procedure for the standardization of the assay rabbits and the method of evaluating prothrombin-reducing concentrates are given in detail. The method of assay can also be applied to the plasma of the bovine, the dog, and the rat. As the rabbit does not acquire immunity to the haemorrhagic agent, it is possible to use the assay rabbits repeatedly after a brief period for recovery is allowed.

IV. The procedure is described by which the haemorrhagic agent in spoiled sweet clover hay was isolated in a pure state from experimentally produced spoiled hays as well as from hays which had been the cause of death of cattle. The chemical and physical properties of the substance, which has the empirical formula $C_{19}H_{12}O_6$, are given; its acidic nature is demonstrated and the acidic properties fall between the usual carboxylic acids and the phenols. The properties of the pure substance appear to be as exceptional and anomalous as the disease which it produces and it could not be identified as any product which has hitherto been found in nature. STEVENSON & WHITE [*V. B.* **11.** 464.] reported that coumarin is indirectly responsible for sweet clover disease of cattle, but the present authors state that the haemorrhagic agent described in this communication is not identical with any of the coumarin derivatives isolated from different members of the Melilotus family. Bio-assay of the crystalline haemorrhagic agent demonstrated that 1·5 mg. caused approximately the same reduction in the prothrombin level of the plasma of standardized susceptible rabbits in 40 hours as 50 g. of the standard spoiled hay sample.

V. It was previously concluded [see IV] that the haemorrhagic agent was not identical with any of the naturally occurring coumarins, but it is now shown by various degradation reactions which led to the chemical synthesis of the substance $C_{19}H_{12}O_6$, that it is a dicoumarin, 3,3′-methylenebis (4-hydroxycoumarin). The chemical and physical properties of the synthetic and naturally occurring products were identical as also were the prothrombin-reducing activities of the two substances. Continued feeding of the synthetic product to rabbits, rats, g. pigs, and dogs produced the haemorrhagic condition characteristic of sweet clover disease. The relation of this investigation to the development of low coumarin strains of sweet clover and the possible use of 3,3′-methylenebis (4-hydroxycoumarin) as an anticoagulant are discussed.

VI. During the degradation of the haemorrhagic agent 3,3′-methylenebis (4-hydroxycoumarin) with 10% aqueous sodium hydroxide, a new δ-diketone, $C_{17}H_{16}O_4$, was isolated. It is now shown by synthesis to be 1,3-disalicylylpropane.—R. ALLCROFT.

MATHEWS, F. P. (1940). **The Toxicity of Sartwellia flaveriae to Goats.**—*J. agric. Res.* **61.** 287–292.

Following the loss in Texas of a number of goats which died showing lesions of hepatic cirrhosis, M. investigated the toxicity of *S. flaveriae*. He fed ten goats with varying amounts of the plant, both green and dried, for periods of 16–128 days; some were fed continuously and when the appetite failed as a result of the poison's action, forcibly, while others were allowed to recover their appetite normally between the feeding periods. As a result four animals, which had been forcibly

fed over a short period, died showing liver necrosis P.M., four, which had been fed at intervals over a long period, died showing pulmonary oedema and hydrothorax, one which showed inappetence was killed for autopsy before serious symptoms developed, and the remaining animal showed no ill effects. Cirrhosis of the liver was not produced.

The plant had photosensitizing effects on the hands at the time when it was gathered, producing a yellow discoloration of the skin, M. had hoped therefore that the experiments might throw some light on the carotenosis of bovine livers as described by BUCKLEY *et al.* (1930) [*J. agric. Res.* **40.** 991.] which had occurred in the same region, and although no conclusive evidence was obtained, he considers that the possibility should not be dismissed.

MUTH, O. H. (1941). **An Attempt to Determine the Toxicity of Amsinckia Intermedia (Tarweed) for Fattening Lambs.** —*J. Amer. vet. med. Ass.* **99.** 145–146.

The seed of *A. intermedia*, commonly found in wheat grown in some parts of north-west U.S.A., has been proved by MCCULLOCH [*V. B.* **11.** 263.] to cause hepatic cirrhosis with icterus and subcutaneous haemorrhages in pigs, horses and cattle. He also found in a trial with a single lamb fed for 91 days on a ration containing these seeds that subcutaneous haemorrhages occurred, but the cause of death was not clear.

Because of the increased use of wheat for fattening lambs, M. made a further test of the toxicity of *A. intermedia* seed for lambs. Wheat containing 25% of *A. intermedia* was fed to two lambs for 128 days; two control lambs were given a similar amount of wheat only. No evident pathological change was found on P.M. examination and no abnormal flavours were detected in parts of the carcasses when cooked. As there have been no reported difficulties in fattening lambs in areas where hepatic cirrhosis of pigs is common when this contaminated grain is fed, M. considers that his negative findings suggest that this food could be better used for fattening lambs than pigs.—C. V. WATKINS.

ANDRÄ. (1941). Klinische Beobachtungen und pathologisch-anatomische Befunde bei nikotinvergifteten Pferden. [**Clinical and Pathological Findings in Horses Poisoned by Nicotine**].—*Dtsch. tierärztl. Wschr.* **49.** 409–410.

Shortly after 36 horses had been washed with a nicotine solution as a treatment for lice, ten of them became ill. One horse died within half an hour of the application of the nicotine and another 5½ hours afterwards. The other eight recovered on being washed down with cold water, receiving cardiac stimulants and being kept out in the air. Cardiac and respiratory distress were the chief symptoms and pathological study of the tissues of the two horses which died indicated oedema of the lungs, engorgement of the heart, and signs of incipient inflammation of the mucous lining of the stomach, intestines and bladder. Haemorrhages were also apparent in the lungs, pericardium, and in some muscles. The hypothesis is advanced that some animals may be particularly sensitive to nicotine poisoning since age, breed, and nutritional condition seemed immaterial in determining the effect of nicotine.
—A. M. COPPING.

STOLZ, A. (1941). SO_2 Vergiftung bei einem Pferde. [**Sulphur Dioxide Poisoning in a Horse**].—*Dtsch. tierärztl. Wschr.* **49.** 410–411.

Treatment of mange in a healthy eight-year-old horse by brief exposure to SO_2 gas, according to accepted army veterinary practice, was followed by severe respiratory and circulatory symptoms, necessitating slaughter of the animal about 30 hours later. Signs of severe irritation of the mucous membrane of the nose and lungs were found at autopsy and histological details are given of the condition of the lungs. The findings were in agreement with other cases of SO_2 poisoning reported in horses after the last war.—A. M. COPPING.

SCHÜLLER. (1941). Kochsalzvergiftung von Schafen. [**Common Salt (Sodium Chloride) Poisoning in Sheep**].—*Berl. Münch. tierärztl. Wschr.* August 15th. 400.

For a flock of 259 ewes and 230 lambs, 15 kg. of common salt was put out on good pasture and six hours later symptoms of poisoning were observed in many animals. The sheep showed nervous symptoms including trembling of the upper lip, weakness of the legs with final inability to stand, and severe diarrhoea. Within three days, 59 sheep and 53 lambs had to be killed. No toxic substance could be detected in the remaining salt and it was thought that although the toxic dose of common salt for sheep is very high, salt-hungry sheep may have consumed too much

when the loose salt was offered. The use of salt licks is recommended in preference to loose salt.—A. M. COPPING.

BELLER, K. (1941). Zur Frage der Hüttenrauchschädigungen. **(On the Problem of Injury by Industrial Chimney Smoke].** —*Dtsch. tierärztl. Wschr.* **49.** 325–328.

In connexion with an action for damages due to loss of cattle, horses, and goats ascribed to the effect of factory fumes and dust on pastures, evidence for injury of animals by zinc, lead and arsenic was examined. The amounts of these three metals found on analysis of the pasture plants, wheat, and rye of the district in question were high enough to be toxic and although the complaint was made specifically for zinc poisoning, the findings suggested that a high intake of zinc combined with large amounts of lead and arsenic was probably responsible for the toxic symptoms observed.—A. M. C.

COLE, V. V., HARNED, B. K., & HAFKESBRING, R. (1941). **The Toxicity of Strontium and Calcium.**—*J. Pharmacol.* **71.** 1–5.

The comparative toxicities of Ca and Sr (as their acetates) in equimolecular quantities were determined on mice and rats. The toxicity of Sr was slightly greater than that of Ca in rats when doses which produced a mortality of less than 60% were given, but with larger doses the toxicities of the two ions were similar. Sr, however, was much less toxic for mice than Ca. An equimolecular mixture of Ca and Sr acetates in rats exhibited a toxicity equal to that of the most toxic ion regardless of the other ion in the range up to a mortality of 85%. In mice, a synergistic effect was obtained with a mixture of the two ions producing a mortality slightly greater than that expected by calculating the total concentration of cations as that of the most toxic ion. Sr, but not Ca, was partially antagonised by pentobarbital. Electrocardiographic studies showed that deaths from Sr in 90% of the rats is due to respiratory failure as compared with cardiac failure in 90% of rats injected with Ca.—ALFRED EDEN.

I. MEYN, A., & VIEHL, K. (1941). Ueber chronische Fluorvergiftungen bei Rindern. **[Chronic Fluorine Poisoning in Cattle].**—*Arch. wiss. prakt. Tierheilk.* **76.** 329–339.

II. DANCKWORTT, P. W. (1941). Nachweis von Fluorvergiftungen durch Bestimmung des Fluorgehaltes der Zähne und Knochen. **[Demonstration of Fluorine Poisoning by Determination of the Fluorine Content of Teeth and Bones].** —*Hoppe-Seyl. Z.* **268.** 18. 7–193

III. HUPKA, E. (1941). Klinische Beobachtungen über Fluorvergiftungen bei Weidetieren. **[Clinical Observations on Fluorine Poisoning in Animals at Pasture].**—*Dtsch. tierärztl. Wschr.* **49.** 349–352.

IV. COHRS, P. (1941). Zur pathologischen Anatomie und Pathogenese der chronischen Fluorvergiftung des Rindes. **[Pathology and Pathogenesis of Chronic Fluorine Poisoning in Cattle].**—*Ibid.* 352–357.

V. DANCKWORTT, P. W. (1941). Der chemische Nachweis von Fluorvergiftungen. **[Chemical Demonstration of Fluorine Poisoning].**—*Ibid.* 365–368.

I. In a district where the pasture was contaminated by smoke from factory chimneys chronic fluorosis was found in many cattle and sheep. The F content of the bones and teeth of cows, calves, and sheep was 7–10 times greater than that of normal animals. Pasture plants, hay, and vegetables such as cabbage had very high contents of F, but acid silage made from beet tops had a relatively low content. There appeared to be clear evidence of contamination of the pasture with F from the chimney fumes.

II. The F content was estimated and it was noted that immersion of teeth and bones in alcohol or boiling in water caused the results to be lower than if these procedures were omitted. Teeth and bones of normal cows contained about 0·0443% of F, whereas those of animals which had fluorine poisoning, due to exposure to factory smoke or grazing contaminated pasture, contained amounts 5–10 times as great. A high fluorine content was also found in teeth from a fossil jaw of the Diluvial period. Teeth from a factory worker suffering from fluorosis had an F content of 0·110% compared with a content of 0·0106% found in normal human teeth.

III. F poisoning was observed in cows, foals, goats, and pigs on pasture with a high F content due to contamination by factory smoke and dust. The symptoms in affected animals are described. Young animals kept on the bad pasture for a whole season lost condition and brought poor prices at slaughter. Confinement

in stalls on a good ration combined with administration of vitamin D, Ca and P preparations, and adrenal extracts, was found a useful therapeutic measure. Young horses examined a year later had no apparent abnormalities of bones or teeth.

IV. Histological study of material from cattle with chronic fluorosis showed that there were two types of bone changes. In some animals there was osteoporosis resembling that found in human cases of osteomalacia; this condition was generally found in young cattle consuming considerable amounts of F. In older animals having smaller amounts of F, exostoses were found on the long bones and jawbones and the sclerotic process was limited to the compact layer.

V. The chemical estimation of F in bones and teeth as a means of diagnosing F poisoning is discussed and results obtained by the methods described in II are quoted for teeth and bones from normal animals and those exposed to high F intake, showing the amount in the latter to be in some cases as much as ten times that in the former. The high F content of fossil teeth is also mentioned.

After this paper there followed a discussion of points raised by HUPKA, COHRS, and DANCKWORTT.—A. M. COPPING.

GRASSET, E., & SCHAAFSMA, A. W. (1940). **Studies on the Venom of the "Boomslang" (Dispholidus Typus).**—*S. Afr. med. J.* **14.** 236–241.

Very few cases of snakebite due to the "boomslang" (tree snake) are on record. Owing to its unaggressive character and the position of the fangs behind the other teeth, an effective bite of man is not common. The amount of venom produced is much smaller than in the other snakes of the Colubridae. The symptoms due to the venom resemble those produced by the Viperidae being mainly due to coagulative and proteolytic principles. There is very little neutralization of the venom by colubrine antisera, which are highly anti-neurotoxic. The relationship to viperine species is shown by the degree of protection against the venom afforded by viperine antisera. —E. M. ROBINSON.

THERAPEUTICS

WAKSMAN, S. A., ROBINSON, H., METZGER, H. J., & WOODRUFF, H. B. (1941). **Toxicity of Actinomycin.**—*Proc. Soc. exp. Biol., N.Y.* **47.** 261-263.

Actinomycin has been shown to have strong bacteriostatic and bactericidal properties *in vitro* [see *V.B.* **12.** R1–R6]. Evidence is presented of the extreme toxicity of actinomycin demonstrated in 320 mice, 60 rats, 19 g. pigs, 32 rabbits, 3 hens, and 50 chick embryos 15 days old. Doses ranging from 0·1–30 mg. per kg. body weight were given intravenously, intraperitoneally, subcutaneously, and orally; 1 mg. or more per kg. was lethal, the toxicity becoming more apparent when observations were extended over a seven day period. The immediate cause of death appeared to be respiratory failure.

Using strains of *Staphylococcus aureus*, *Clostridium welchii*, *Streptococcus haemolyticus*, and type I pneumococcus, it was shown that the bacteriostatic effect of actinomycin slowly became bactericidal over a five-day period and that the presence of serum did not affect its efficiency. Doses of 0·1–1 μg. of actinomycin afforded no protection to mice infected with *Str. haemolyticus* or type I pneumococcus, but in a control group of mice 3 μg. of gramicidin afforded complete protection. Doses of 50 μg. actinomycin were ineffective in protecting g. pigs and incubated eggs against a virulent strain of *Brucella abortus*. A dose of 2·5 μg. actinomycin per 20 g. of animal weight, using mice, rats, and chickens, was found to disappear from the circulating blood within 60 min. after administration. It is suggested that the lack of *in vivo* activity may be due among other things, to its rapid disappearance from the blood.—R. ALLCROFT.

LIBBY, R. L. (1940). **The Activity of Chemotherapeutic Agents.**—*J. Bact.* **40.** 733–745.

Details are given of a rapid method for studying and demonstrating the *in vitro* activity of chemotherapeutic agents on organisms during the first four hours of incubation. Essentially the method involves a comparison of the population densities in drug and control tubes during a four-hour incubation period. The increase in population numbers was obtained by taking photronreflectometric tur-

bidity readings at hourly intervals. Only cultures in the logarithmic growth phase were used to inoculate the tubes; the drugs used were sulphanilamide, sulphapyridine, and sulphathiazole. L. points out that it is generally accepted that there is a lag period of 2–6 hours before the *in vitro* effect of a drug becomes apparent, but there is no indication from the data presented here of any lag phase. This may be due to the fact that small differences in population density can be detected by photronreflectometric determinations, and to the fact that by this method both viable and non-viable organisms are estimated. The effect of the drugs on susceptible organisms was directly related to the concentration of the drug within certain limits, and to the size of the initial inoculum.—R. ALLCROFT.

JOHNSON, H. W., & FARQUHARSON, J. (1941). **Newer Developments in the Therapy of Shipping Fever in Cattle.**—*J. Amer. vet. med. Ass.* **99.** 103–106.

Information is given on the prophylaxis and therapeutics of "shipping fever" in cattle. The use of bacterins, aggressins, and sera and the most suitable time for vaccination are discussed. If this method of prophylaxis is used the animals should be vaccinated not later than ten days before shipment. Of the chemical therapeutic agents, potassium guaiacol sulphonate injected intravenously gave the most satisfactory results. The preparation used contained 5 g. potassium guaiacol sulphonate, 10 g. of 95% ethyl alcohol, 5 g. sodium iodide, and 90 g. sterile water; the dose varied from 75–150 ml. according to the weight of the animal. In numerous cattle treated with this preparation during a period of two years nearly 100% recoveries were obtained.—R. ALLCROFT.

GREEN, C. A. (1941). **The Effect of Prontosil Therapy on the Antistreptolysin O Titre in Rabbits During Immunisation.**—*J. Path. Bact.* **53.** 213–221.

In a series of experiments in which rabbits were immunized by direct injection of streptolysin and by the indirect method of subcutaneous agar implants of virulent streptococci, G. found that treatment with prontosil had neither inhibitory nor stimulatory action on antibody production.—ALEX. THOMSON.

GLYNN, L. E. (1941). **The Effects Of Sulphanilamide, Sulphathiazole and Sulphapyridine on the Development of Granulation Tissue and their Toxic Action on Striped Muscle.**—*J. Path. Bact.* **53.** 183–188.

The technique used in this investigation is described in detail and G. illustrates his findings by the inclusion of four plates containing eight histological sections of treated and untreated wounds. The conclusion drawn from this work is, that whilst the injury done to striped muscle by the local application of the drugs is slight, that caused by sulphanilamide is definitely the greatest. This action may be due, in part, to the greater solubility of this drug. The inhibitory action of the drugs on the proliferation of fibroblasts is so slight that impairment of healing in flesh wounds is extremely unlikely.—ALEX. THOMSON.

ROSENTHAL, S. M. (1941). **The Influence of Dietary Factors upon the Therapeutic Activity of Sulfanilamide in Mice.**—*Publ. Hlth Rep., Wash.* **56.** 1880–1889. [Author's summary copied *verbatim*].

Wide variations in the therapeutic response to sulfanilamide can be produced in mice by alterations in the diet. A study of dietary constituents indicates that the protein fraction is important in the inhibition of the action of sulfanilamide.

Mice on a diet deficient in proteins have shown higher concentrations of sulfanilamide in the blood.

BRYAN, A. H. (1941). **Clinical Observations on the Use of Sulfapyridine in the Treatment of Canine Distemper.**—*Vet. Med.* **36.** 365–367.

An account of the treatment of thirty-two dogs, affected with distemper, by administration *per os* of 0.5–2 g. sulfapyridine daily for 2–3 days, 18 of them also receiving serum. There were 30 untreated controls. With the exception of four chronic cases which died or were destroyed, all of the treated animals completely recovered within four days. In the controls the disease ran a long course and all but seven died or were destroyed.—D. D. OGILVIE.

MANWELL, R. D., COUNTS, E., & COULSTON, F. (1941). **Effect of Sulfanilamide and Sulfapyridine on the Avian Malarias.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 523–525.

Sulphanilamide and sulphapyridine were injected intraperitoneally and intramuscularly into canaries infected with *Plasmodium circumflexum*, *P. relictum* var. *matutinum*, and *P.*

nucleophilum. The only species affected was *P. circumflexum* which was susceptible to sulphapyridine. This drug caused a rapid disappearance of the parasites from the blood and was capable of " aborting " the appearance of parasites, but it was less effective than plasmochin, atebrine, or quinine.—R. A.

LIBBY, R. L., & JOYNER, A. L. (1940). **The Action of Sulfathiazole on the Colon-Typhoid-Dysenteriae Group of Organisms.**—*J. infect. Dis.* **67.** 67–69. [Authors' summary copied *verbatim*].

It has been shown that sulfathiazole has considerably more in vitro activity than sulfapyridine or sulfanilamide against the colon-typhoid-dysenteriae group of organisms. It is suggested that this drug be given clinical trials in this group of infectious diseases.

ROBERTS, F. H. S. (1941). **Phenothiazine as an Anthelmintic for Horses, Cattle and Pigs.**—*Aust. vet. J.* **17.** 130–137.

Experiments on 14 horses, 8 calves, and 14 pigs showed that phenothiazine was highly effective against strongyles, and very satisfactory against ascarids in horses, was very promising against *Haemonchus*, *Ostertagia*, and *Trichostrongylus*, *Cooperia*, and *Oesophagostomum* in calves, and highly effective against *Oesophagostomum* in pigs. At higher dose rates there was evidence of efficiency, high in some cases, against *Ascaris* in pigs. The drug was ineffective against *Ascarops*, *Hyostrongylus*, and *Trichuris* in pigs.

Evidence indicated that under certain conditions phenothiazine may be toxic for horses, sometimes seriously so. It is suggested that toxic effects may be guarded against by feeding large amounts of bran before, during, and for some days after treatment. It appeared that cattle were by no means as tolerant to phenothiazine as sheep. Ill effects, including loss of appetite, constipation, diarrhoea, incoordination, fever, shock, tympanites, weakness, discharge from the eyes, and severe abdominal pain, were seen in calves. One animal died and showed ulceration and oedema of the abomasum. In pigs, doses of up to 0·4 g. per lb. body weight were well tolerated. At higher dose rates, toxic effects were seen, chiefly in the form of incoordination of the hind quarters.—H. McL. G.

DEEDS, F., & THOMAS, J. O. (1941). **Studies on Phenothiazine. IX. The Biliary Excretion and Anthelmintic Action of Thionol.**—*J. Parasit.* **27.** 143–151.

Examination of the bile after oral administration of phenothiazine to two rabbits, one dog, and one man, showed the presence of phenothiazine, thionol, and leucothionol in the bile demonstrating the biliary excretion of these substances. This evidence suggests an explanation for the presence of these substances in the intestinal tract, apart from any unabsorbed phenothiazine, or thionol and leucothionol formed from phenothiazine *in situ*.

In vitro experiments showed that thionol had a definite effect on *Ascaris lumbricoides* but that phenothiazine had no action. Thionol first caused stimulation of the ascaris, followed by depression which persisted as long as an adequate concentration of thionol was present; bile facilitated the development of the depressant action of thionol. It is suggested that the anthelmintic action of phenothiazine is due to the thionol excreted into the intestine by way of the biliary tract and that bile facilitates this action. The possible mechanism of the action of thionol is briefly discussed.—R. ALLCROFT.

ZEETTI, R. (1939). Sull'azione del mentolo di fronte ai germi del gruppo "Brucella". **[Action of Menthol on Organisms of the Brucella Group].**—*Boll. Ist. sieroter., Milano.* **18.** 140–147. [German summary].

Menthol at a concentration of 1 : 5,000 in broth had a very noticeable inhibitory action on the growth of *Br. melitensis*, *Br. paramelitensis*, and *Br. suis* while *Br. abortus* was practically unaffected. In a dilution of 1 : 3,000 it killed *Br. melitensis*, *Br. paramelitensis*, and *Br. suis* after 16 hours, but most strains of *Br. abortus* were viable after 24 hours' treatment with the same solution.—MILLER WATSON.

KETY, S. S., & LETONOFF, T. V. (1941). **Treatment of Lead Poisoning with Sodium Citrate.**—*Proc. Soc. exp. Biol., N.Y.* **46.** 476–477.

A report is given of the rapid alleviation of symptoms of lead poisoning by oral administration of sodium citrate to human patients. As no untoward reactions were observed and the blood lead concentration returned to normal, it is suggested that sodium citrate may be a useful therapeutic agent in lead poisoning. —R. ALLCROFT.

BARTELS, & SCHMID, F. (1941). Neue Versuche zur Bekämpfung der Schafräude. **[Tests of New Remedies against Sheep**

Scab].—*Dtsch. tierärztl. Wschr.* **49.** 208–211.

The authors suggest that a proprietary remedy of undisclosed composition, "parachloran", is easier to use as a sheep dip than lime-sulphur, because of the trouble in preparing the latter for the tank, and that it is as effective. They give some details of a few affected flocks that were treated.—H. E. H.

BRUCE, W. G. (1940). **Intravenous Injections of Arsenic Ineffective in Controlling Horn Flies on Cattle.**—*J. Kans. ent. Soc.* **13.** 128–129.

B. injected *m*-amino-*p*-hydroxyl phenyl arsine oxide in an isotonic aqueous solution into the jugular veins of a heifer. Nine injections of 0·06 g. of arsenical were given, followed by ten injections of 0·04 g., over a total period of 41 days. A large proportion of the arsenic was excreted in the faeces and urine, and sufficient arsenic was present in the droppings to be toxic to horn fly larvae. The concentration produced in the blood had no apparent affect on horn flies (*Lyperosia irritans*) feeding on the animal. —W. MOORE.

PUBLIC HEALTH

LUPU, A. (1939). Dare de seamă asupra activitàţii laboratorului abatorului municipiului Bucureşti pe anul 1938 şi probleme noi in bacteriologia cărnei. [**Report of the Municipal Abattoir Laboratory, Bucarest, on Meat Inspection in 1938**].—*Arhiva vet.* **31.** 52–80. [French summary].

During the year, from animals slaughtered in the abattoir, *Bacillus anthracis* was isolated 18 times, *Erysipelothrix rhusiopathiae* 18 times, *Mycobacterium tuberculosis* 13 times, *Salmonella enteritidis* var. *dublin* twice, and *S. cholerae-suis* twice.

Trichinoscope examinations numbered 170,442, and 119 cases of trichinosis were verified. Swine trichinosis appears to be of frequent occurrence in some parts of the country. [The report does not state whether every pig carcass is examined by the trichinoscope.]

In 22 cases whole swine carcasses were condemned because of generalized sarcosporidiosis.

The report includes a description of forms used to facilitate the co-ordination of work of meat inspectors and laboratory staff.—M. W.

LUPU, A. (1939). Intoxicaţiunile alimentare şi rolul medicului veterinar în prevenirea lor. [**Food Poisoning and Its Prevention**].—*Rev. Med. vet., Bucureşti.* **51.** 228–267.

This is a lecture to members of the Rumanian veterinary association on the various forms of food poisoning, such as meat poisoning in man. Methods of control by inspection are also discussed and statistics on food poisoning in Rumania are given. No new knowledge is contributed.—MILLER WATSON.

TURNER, G. E., & SMITH, F. R. (1941). **Sources of Hemolytic Enterococci Found in Milk.**—*J. Milk Technol.* **4.** 183–186.

Haemolytic enterococci having been isolated from human, horse, and cow faeces and also from cows' milk, the authors investigated possible sources of milk contamination other than faecal.

The examination of milk from 16 dairies showed that milk from three of them was infected with these organisms. In one dairy the organisms were recovered from the drinking water, in another from both the drinking water and the cows' faeces whilst in the third, water, food, and faeces were all negative.

Quarter samples from each cow in the three herds were examined, but the enterococci were only isolated in small numbers from three quarters of one cow. This cow was apparently free from mastitis.

The cows in the herds from which the milk was negative were continually housed whilst those from which infected milk was obtained were allowed to graze. Examination of herbage failed to reveal the organisms which were, however, present in the faeces of beef cattle on the same pastures as one of the milk herds.—H. E. BYWATER.

I. MOEGLE, E. (1941). Neuzeitliche Tierkörperbeseitigung. [**Modern Methods of Carcass Disposal**].—*Berl. Münch. tierärztl. Wschr.* April 18th. 189–195.

II. HAUCKE. (1941). Die Tierkörperbeseitigung in Belgien. [**Disposal of Animal Carcasses in Belgium**].—*Dtsch. tierärztl. Wschr.* **49.** 427–429.

III. GOLDMANN. (1941). Das Tierkörperbeseitigungsgesetz vom 1. Februar

1939, seine Durchführungsverordnungen und die zugehörigen Erlasse. **[The Animal Carcass Disposal Law of February 1st 1939, its Executive Orders and Decrees]**.—*Berl. Münch. tierärztl. Wschr.* Sept. 5th. 432–435.

IV. LOCKAU, U. (1941). Praktische Erfahrungen in der Tierkörperbeseitigung. **[Practical Experiences in Animal Carcass Disposal]**.—*Ibid.* 435–436.

I. M. describes recent developments in animal carcass disposal in Germany. The objects of it are twofold, *viz*, the hygienic elimination of sources of disease for animals and man, and the obtaining of valuable byproducts in the form of fat and animal meal which are economically worth producing by means of the latest heat-treatment plants.

II. The disposal of animal carcasses in Belgium was governed by the Animal Diseases Law of 1882. In January 1941, new regulations came into force prohibiting disposal by any way other than through a proper rendering plant and requiring rapid collection, etc. The country was already provided with an adequate number of plants, which after slight improvements will be regarded as satisfactory.

Methods of collection and of heat treatment are outlined and figures are given for the areas and cattle populations to be served by the seven plants.

III. This is an analytical and descriptive commentary on the law and its technical supplements [see *V. B.* **12.** 63].

IV. A general commentary on I with reference to the economical working of rendering plant, difficulties of collection due to terrain and weather, etc.

TECHNIQUE AND APPARATUS

*HÖLZEL, E. (1939). Ueber die Knochenmarkspunktion beim Rind. **[Bone-Marrow Puncture in Cattle]**.—*Inaug. Diss., Berlin.* [Abst. from abst. in *Berl. Münch. tierärztl Wschr.* Feb. 21st. 94. (1941)].

After referring to the work of others on the obtaining of bone-marrow samples from domestic animals, H. describes his own work. He found that an equine type epidural anaesthesia cannula was suitable also for bone puncture in cattle, in combination with a "Record" syringe. [It is not stated in the abstract which bones were tapped, nor is the exact technique described.] A drop of the puncture material was smeared on a slide and, after drying in air for 3 min., was fixed in methyl alcohol and stained by the May-Grünwald-Giemsa method. Bone-marrow smears require a longer time for staining than blood smears. The microscopic picture of erythrocytes, leucocytes, lymphocytes, megakaryocytes, reticulocytes, and plasma cells is described. The importance of the examination lies not in the types of cell found but in the discovery whether certain cells are very numerous or absent. In cattle, death alone does not result in any cell changes. Further investigation is required to determine the cell changes during illness; the examination of the bone marrow of some tuberculous cattle revealed no apparent changes in the marrow cells.—E. C. HULSE.

OLSON, C., Jr. (1941). **A Simple Instrument for Mincing Tissue**.—*Amer. J. vet. Res.* **2.** 295–296.

O. refers to trocars, mincing machines, etc. that have been used for tumour transplantation. He describes an adaptation of a brass Luer-Lok syringe of 20 ml. capacity which is fitted with a detachable perforated disc instead of the usual nozzle for a needle. The disc is made of $\frac{3}{32}$ in. thick steel and case hardened after being drilled as many times as possible with a no. 60 drill. Particles of tissue forced through these holes readily pass through a 15-gauge needle for inoculation purposes. When hard fibrous tumours are being dealt with, a disc with larger holes is first used. Little morphological change is produced in relatively soft tumour tissues by the pressure of forcing them through the instrument. Although many free cells may be found in a saline suspension of the treated tissue, the majority of the cells remain in small clumps.—C. V. WATKINS.

*KIRCHMEYER, W. (1940). Beiträge zur Technik der Sublimatprobe nach Fulton. **[The Technique of Fulton's Sublimate Test]**.—*Inaug. Diss., Hanover.* [Abst. from abst. in *Berl. Münch. tierärztl. Wschr.* Feb. 21st. 93. (1941)].

The author made a considerable number of tests to determine whether the use of old or freshly prepared sublimate solution had any

effect on Fulton's sublimate test and, further, whether different methods of storing sera influenced the result. It was shown to be of no importance whether fresh or old solution was used or whether the sera were kept in daylight at room temperature or in the dark at a lower temperature. The only difference noted was that unsealed sera stored in daylight at room temperature gave a weaker reaction to the test than sealed sera stored in the dark. The reaction to the sublimate test of the latter showed no change after three days' storage.

—E. C. HULSE.

KERBY, G. P., & CALDER, R. M. (1940). **Culture Media for Brucella.**—*J. Bact.* **40.** 637–643.

A large number of substances, including various vitamins, was investigated to ascertain their effect as growth-promoting factors for brucella when added to the basic medium "bacto-tryptose broth". A milk medium consisting of 2% bacto-tryptose, 0·5% sodium chloride, and 1 : 700,000 crystal violet, made up with fresh, whole, grade A pasteurized milk showed some promise, but difficulty was encountered in standardization owing to indefinable differences in the samples of milk used. A sodium caseinate medium consisting of 2% sodium caseinate, 2% "bacto-tryptose", 0·1% "bacto agar", 0·5% sodium chloride, and 1 : 700,000 crystal violet appeared somewhat effective for growing *Br. abortus*, but here too considerable variations appear likely to occur in batches of medium.—J. R. LAWSON.

KARLSON, A. G. (1940). **The Comparative Values of Certain Mediums for the Isolation of Bovine Tubercle Bacilli.**—*J. infect. Dis.* **67.** 1–4. [Author's summary copied *verbatim*].

Tuberculous lesions from naturally infected cattle were cultured on glycerinated and non-glycerinated forms of four mediums. Bovine tubercle bacilli were isolated on the mediums not containing glycerin more frequently than on mediums containing it. The colonies were larger and appeared about a week earlier than on glycerinated mediums. A medium made by adding the yolk of one egg to 150 cc. of melted and cooled beef extract agar gave satisfactory results. There was no advantage in using potato extract or meat infusion for the agar base. Since glycerin is demonstrated to inhibit the development of the bovine tubercle bacillus on original isolation it is recommended that non-glycerinated mediums as well as glycerinated be used in attempting isolation of tubercle bacilli from materials which might contain the bovine type of the tubercle bacillus.

MCCLUNG, L. S. (1940). **The Use of Dehydrated Thioglycollate Medium in the Enrichment of Spore-Forming Anaerobic Bacteria.**—*J. Bact.* **40.** 645–648.

The author recommends that the dehydrated thioglycollate medium of BREWER (1940) be given a trial. It compares favourably with the complex meat infusions. It gives good growth from small amounts of seed material, is easily prepared, and stays reduced for days after sterilization, so that inoculation can be done without heating the tubes.

KRAJIAN, A. A. (1941). **A New Staining Method for Gram-Positive and Gram-Negative Organisms in Frozen Sections.**—*Arch. Path.* **32.** 825–827. [Author's summary copied *verbatim*].

A new method for the demonstration of gram-positive and gram-negative organisms in frozen sections is presented. The staining solutions used are: alum-hematoxylin, brilliant green, copper sulfate-zinc sulfate, carbolfuchsin, dioxane, ammonium nitrate and creosote-xylene.

BEKKER, J. H. (1941). Der Tuberkelbazillennachweis im Sputum. (Vergleichende Untersuchungen über das S.E.S.-Verfahren und die Antiforminanreicherung]. **[The Demonstration of Tubercle Bacilli in Sputum. Comparison of Jungmann and Gruschka's "S.E.S." (*Säure-Eisen-Sauerstoff* = Acid-Iron-Oxygen) Enrichment Method and the Antiformin Method].**—*Zbl. Bakt. I. (Orig.).* **146.** 347–349.

From the results of parallel tests on an equal number of sputum samples, the Ziehl-Neelsen staining method being used as a common control, it appeared that the S.E.S. method was slightly inferior to the antiformin culture method in detecting tubercle bacilli in stained sediment smears. The S.E.S. method consists of adding to 5 ml. sputum 3 ml. of a solution made up by 10 vol.% H_2SO_4 and 10% ferrous sulphate, shaking, adding 3 ml. of 3% H_2O_2, shaking and centrifuging. The sediment is washed in 2% Na lactate, again centrifuged, and smeared on a slide.—J. E.

STEENKEN, W., Jr. (1941). **Tray for Staining Tubercle Bacilli.**—*Amer. Rev. Tuberc.* **44.** 115–117.

When many slides for tubercle bacilli are stained in the same container at the same time, there is a risk of the contamination of the negative smears with acid-fast organisms from positive smears. S. has devised a small porcelain tray to eliminate this possibility. The tray is divided into six shallow compartments. For staining large numbers of smears, wire racks containing ten trays are used. The smears are immersed in the stain and the racks are placed in the incubator at 37·5°C. overnight.—E. C. H.

PEERS, J. H. (1941). **A Modification of Mallory's Phosphotungstic Acid-Hematoxylin Stain for Formaldehyde-Fixed Tissues.**—*Arch. Path.* **32.** 446–449. [Author's summary copied *verbatim*].

In order to make possible staining of formaldehyde-fixed tissues with Mallory's phosphotungstic acid hematoxylin, it is suggested that paraffin sections be mordanted for three hours in hot saturated aqueous solution of mercuric chloride. This technic has been described in detail. Several earlier technical modifications for the same purpose have been noted and discussed.

FLEMING, A. (1941). **Some Uses of Nigrosin in Bacteriology.**—*J. Path. Bact.* **53.** 293–296.

F. recommends a 10% aqueous solution of nigrosin as a negative stain for bacteria. It may be applied as a thin smear over a fixed unstained smear of bacterial suspension, or it may be mixed with the suspension before being smeared on a slide. Nigrosin is a decolourizing agent and when it is applied to prepared Gram or methylene blue bacterial smears, the stain is rapidly removed. In this way nigrosin is very useful in demonstrating diphtheroid granules and bacterial spores which retain the original stain applied to them. The method is also of some use in the demonstration of capsules.—E. C. HULSE.

MISCELLANEOUS

WARE, F. (1940). **Progress of Veterinary Research in India during the Past Twenty-Five Years.**—*Misc. Bull. Imp. Coun. agric. Res. India.* No. 35. pp. 37.

This review describes advances made under the heads of veterinary bacteriology and immunology, protozoology, entomology, animal breeding and genetics, and animal nutrition in India since 1911 and indicates the present position with regard to the different diseases of that country.

During this period, the number of gazetted staff in the Civil Veterinary Departments in India increased from 36 to 147 and the subordinate staff from 955 to 2,085. Researches on the prevention and control of animal diseases, which were at first concentrated at the Imperial Veterinary Research Institute, Mukteswar, are now also undertaken at provincial veterinary and serum laboratories. Biological products are manufactured on a large scale at the Imperial Institute and to a small extent elsewhere.

In the matter of disease control, the most striking success has been the introduction of the goat-virus vaccine for rinderpest. Specific sera and vaccines have also been evolved and are now prepared at Mukteswar against haemorrhagic septicaemia, anthrax, blackleg, bovine lymphangitis, and fowl cholera. Tuberculosis, Johne's disease, abortion, and mastitis are being investigated, as also are strangles, glanders, equine abortion, poultry diseases, canine fevers, and many affections of sheep and goats.

The importance of protozoan diseases in tropical countries is increasingly recognized and chemotherapeutic measures, found by experiment to be effective, have been adopted in practice.

The various insects of importance in disease transmission have been carefully studied, as well as the pathogenic protozoa so transmitted. Knowledge regarding insect pests of domestic animals in India has been considerably increased and a large literature now exists on their life-histories, physiology, morphology, and bionomics.

An account is given of the helminths which occur in India and of the various diseases, such as bovine nasal granuloma, equine hepatic cirrhosis, " bursati ", " khoojlee ", hump sore, and verminous pneumonia, for which they

have been found to be responsible.

As the more important contagious diseases have been brought under control, more attention has been given to cattle breeding and scientific feeding. Cross-breeding between imported and country cattle being unsuitable in the long run, the development of indigenous breeds of Indian cattle by selective breeding is now in progress. A start has also been made in the study of goat, sheep, and poultry breeding. Horse breeding continues to be mainly in the hands of the Army Remount Department.

In recent years, better provision has been made for the study of animal nutrition problems in India. Attention was at first concentrated on the question of feed in relation to the productive capacity of the animals. Since 1930, the question of malnutrition in relation to the health of animals has been studied at the Imperial Institute and valuable information has been obtained as to the extent of nutritional disorders of animals in different parts of the country and the methods of their prevention. Feeding experiments of all kinds have also been in progress and, in view of the limited fodder resources of the country, the question of the conservation of foodstuffs has received much attention and work on silage making etc. is being carried out in several centres.—L. H. S.

SHIRLAW, L. H. (1940). **A Short History of Ayurvedic Veterinary Literature.**—*Indian J. vet. Sci.* **10.** 1–39.

S. reviews such ancient Hindu literature as throws light upon what it is suggested may be the oldest system of veterinary medicine in the world (*circa* 2000 B.C. to 1200 A.D.).

MCADORY, I. S. (1941). **The Veterinary Situation of the South.**—*J. Amer. vet. med. Ass.* **98.** 359–362.

In his presidential address to the Southern Veterinary Medical Association, the author reviewed animal disease conditions in the southern states.

Anthrax causes little trouble and is stated to be controlled with the aid of dead vaccine. The incidence of bovine TB. is less than 0·5%, bovine brucellosis is under control by the Federal-state scheme but porcine brucellosis is present in the south-east. Equine encephalomyelitis has been declining since 1939, but needs to be controlled firmly: the new chick-embryo vaccine for intradermal inoculation is extremely effective. Swine fever is prevalent; the common misuse of virus is stated to be the cause of many outbreaks. Infectious keratitis or "pink eye" of cattle causes much trouble in Alabama: its cause is not certainly known. Parasitic and nutritional diseases are also referred to as a cause of loss.—J. E.

—. (1941). **Report of Committee to Study Requirements of Ideal State Live Stock Sanitary Service Organisation.**—*Proc. 44th ann. Meet. U.S. Live Stk sanit. Ass., 1940.* pp. 48–52.

The committee recommend that in the best interests of the livestock industry and the veterinary profession the veterinary service of a state should be a separate department actively co-operating with the state department of health and agriculture. The livestock sanitary board should be composed of two veterinarians, two livestock men, a member engaged in animal disease or animal husbandry problems and appointed by the state agricultural college or university, and a physician associated with public health work. The board should appoint an executive officer who would be the state veterinarian. This officer would be the secretary of the board and would act for the board when it was not in session. The duties of the board would include the supervision of the sanitary conditions of the livestock in the state, the promotion and protection of the livestock industry, and the promulgation of regulations for the combating of dangerous communicable diseases of livestock in the state, or livestock intended for importation into the state. The board should establish a system of meat inspection and meat grading in any area in the state in which it is considered desirable, and should supervise the production and distribution of milk, provided always that any municipality may legislate in regard to meat inspection and meat grading, the inspection and grading of dairies or dairy products, and the handling and sale of livestock within its area, such legislation not being in conflict with the powers delegated to the livestock sanitary board. The board should be responsible for the supervision and control of manufactured foods for livestock, and the manufacture, importation, sale, and method of handling of any biological remedy or curative or diagnostic agent for the treatment or diagnosis of disease in livestock.—H. V. HUGHES.

I. BAUER, E. (1941). Das französische Zivilveterinärwesen. [**French Civil Veterinary Affairs**].—*Dtsch. tierärztl. Wschr.* **49.** 421–423.

II. HALL. (1941). Das Veterinärwesen des Elsasses im Aufbau. [**Veterinary Work in Alsace in Process of Organization**]. —*Ibid.* 423–424.

I. This is an account of the French veterinary organization as observed by a German veterinary officer in service in occupied France. He describes the fundamentals of the State control of animal diseases, meat inspection, carcass disposal, animal protection, and veterinary education.

In all fields of work the French left much to be desired, as judged by German standards.

II. A short description of the reorganization in veterinary matters which was found necessary by the Germans on their occupation of Alsace. It was necessary to restock abandoned farms and to supply veterinary supervision. It was found necessary to organize a means for the disposal of animal carcasses.—J. E.

BLAKE, T. A. (1941). **Bull Fertility Testing Service.**—*N.Z. J. Agric.* **63.** 209–212.

A bull-semen testing service has been provided free of charge to the dairy farmers throughout New Zealand by the Department of Agriculture, specimens being collected by veterinarians and stock inspectors. Data were collected enabling the performance of 69 of these bulls to be tabulated against their classification by semen examination and the results indicated the value of the service in detecting the bull of low fertility. During the year at least 19 bulls were found with less than 30% fertility and a further four with less than 50% fertility out of a total of 138. It is emphasized that the bull is not the only factor in sterility and where trouble is experienced and the bull is diagnosed as good or even moderate, veterinary advice should be sought in regard to the cows. Steps are being taken to increase the efficiency of the service.—M. B. BUDDLE.

RANSON, R. M. (1941). **New Laboratory Animals from Wild Species. Breeding a Laboratory Stock of Hedgehogs** (*Erinaceus europaeus* L.). — *J. Hyg., Camb.* **41.** 131–138.

A clean and constant supply of hedgehogs is often required for experimental work. Considerable difficulty has been experienced in breeding animals under convenient artificial conditions and no success has attended attempts to breed hedgehogs in laboratory cages, but R. describes methods by which they can be bred and reared in open-air pens. The paper includes useful details connected with the feeding and handling of adults and the palpation of embryos *in utero*.—C. HORTON SMITH.

OFFICIAL AND OTHER REPORTS

GREAT BRITAIN. (1941). [**Report on**] **Inspection and Supervision of Food [1939].**—*Rep. med. Offr Hlth Preston, 1939.* pp. 28–32.

Four cows affected with TB. were found during routine inspection of dairy herds in the borough. Of 238 milk samples examined, 17 (raw milk) contained tubercle bacilli, while all the samples of designated milk were free from infection. In addition, 32 samples of milk from 13 individual cows in "accredited" herds were examined, and one sample contained the bacilli. 12,632 bovines (including 1,729 calves), 59,464 sheep, and 9,936 pigs were slaughtered in the public abattoir. 1,294 bovine, 219 pig, and 230 sheep carcasses were condemned.

*TANGANYIKA TERRITORY. (1940). **Annual Report of the Department of Veterinary Science and Animal Husbandry 1939.** [LOWE, H. J.] pp. 4. Dar es Salaam: Govt. Printer. [fcp] [50 cents].

Owing to war-time economy the original report of the Director of Veterinary Services had to be drastically abbreviated.

Section I deals with the livestock position in the Territory, which was again disappointing owing to the lack of adequate rainfall.

Section II (a) describes briefly disease control and laboratory operations. Several conferences on RINDERPEST were held in the East African territories. Among proposals, made chiefly with a view to preventing spread of the disease to the south, were:– (a) establishment of a rinderpest intelligence service; (b) triple vaccination within a belt across the southern borders of Tanganyika; (c) vigorous measures against active foci, and (d) game patrol of affected areas. The disease was active in

various parts of the Territory. In the Musoma district, 40,000 triple vaccinations were carried out against BOVINE CONTAGIOUS PLEURO-PNEUMONIA. EAST COAST FEVER is enzootic in many parts and caused some 50% mortality in calves. The establishment of compulsory dipping areas was being considered.

Work at the Mpwapwa laboratory included the production of RINDERPEST vaccine and antiserum and studies on problems of disease, nutrition, breeding, soil erosion, pasture, and water conservation.

Section II (*b*) deals with animal husbandry, the operations of the department in this connexion being described in detail. 55,000 scrub bulls, 789 donkeys, and 33,000 goats were castrated. In the Northern Province a pack donkey transport column was formed for the military authorities. STERILITY in cattle appeared to be on the increase and was given attention.

The department deals with ghee (clarified butter) production and the preparation of hides and skins; details are given of the output of these products.

Owing to lack of funds and personnel, the establishment of dipping tanks, the clearing of tsetse bush, and the improvement of stock routes were hindered and this hampered the efforts to control disease and loss by inanition.

Section III is concerned with legislation. The "Animal Disease Ordinance" no. 22 of 1939 was published.—J. K. H. WILDE.

*TANGANYIKA TERRITORY. (1941). **Annual Report of the Department of Veterinary Science and Animal Husbandry 1940.** [LOWE, H. J.] pp. 6. Dar es Salaam: Govt. Printer. [fcp] [Sh.: 1/–].

Routine activities and normal progress of the department were mainly concerned with the control of RINDERPEST and the production of slaughter stock, etc. for the armed forces and internment camps.

Section I deals with livestock. The year was reasonably good, although a degree of failure of rainfall was experienced. Anti-soil erosion measures were continued.

Section II (*a*) describes disease control. At Iringa abattoir in the Southern Highlands province, 12% of carcasses were found to be affected with TUBERCULOSIS. 10,400 inoculations were carried out against BLACKLEG. CONTAGIOUS ABORTION is now considered to be endemic in the Engare-Nairobi district of Moshi and a connexion is believed to exist between this and reports of UNDULANT FEVER in human beings. In Moshi district also, there was an outbreak of ANTHRAX in human beings from the consumption of an infected carcass. It is stated that in one instance an apparently healthy beast was found after slaughter to be infected. Many deaths due to WHITE SCOUR occurred in grade calves. STREPTOTHRICOSIS and FOLLICULAR MANGE in cattle were reported and appeared to be associated with inanition. With regard to TRYPANOSOMIASIS, the "fly" situation is described as unsatisfactory, especially at Dar es Salaam, and is certainly deteriorating at the Kelema river in Kondoa district. Attempts to control EAST COAST FEVER by the building of more dipping tanks were continued, but losses on stock routes were still high. The position with regard to BOVINE CONTAGIOUS PLEURO-PNEUMONIA was unsatisfactory. A vigorous campaign, particularly in the south of the Territory, was carried on against RINDERPEST, nearly all the cattle south of the central railway being immunized. At the end of the year, the disease had been suppressed, as far as could be ascertained, in the whole of this area except for a small outbreak in game in one area. In all these efforts, Kabete attenuated goat virus (K.A.G.) or triple vaccination with tissue vaccine was used.

Routine laboratory operation swere carried out, including examination of morbid specimens, production of RINDERPEST vaccine, milk analyses etc. Rinderpest immunity tests were carried out and experiments with K.A.G. virus led to the conclusion that danger of spread of the disease by the use of this virus is negligible. Some work on blood groups in cattle was done, but the results were unsatisfactory. Some new trypanocidal drugs were tested. The poultry unit was maintained in a very satisfactory condition.

Section II (*c*) includes an account of the operations in relation to the cattle trade, and states that stock routes were improved and losses were reduced by the establishment of dipping tanks.

Section II (*d*) deals with veterinary education. An attempt to resuscitate the course of training for African veterinary assistants was made in December 1940, and animal husbandry assistants received practical instructions throughout the year.

Section III deals with legislation. Two new

ordinances relating to livestock were published.

Section IV gives statistical information. The livestock census is shown in a table.

—J. K. H. WILDE.

UNITED STATES OF AMERICA. (1940). **Report of the Chief of the Bureau of Entomology and Plant Quarantine, 1939.** [STRONG, L. A.] pp. 117. Washington, D.C.: U.S. Dep. Agric. [15 cents].

The report includes a brief account of investigations during 1938–39 on insects affecting animals. For control of primary screwworm, *Cochliomyia americana*, diphenylamine, applied to wounds every third day, is recommended because of its low cost and availability. Vaccines prepared from screwworm larvae and from organisms and fluids from infested wounds failed to reproduce the partial immunity obtained in sheep and g. pigs as a result of infestation [see BORGSTROM—*V. B.* **9.** 248]. A three-year survey showed that the screwworm overwinters in restricted areas south of 30°N.; it disappears from Texas in cold winters except for a small area in the lower Rio Grande Valley, in Arizona it is limited to the southern valleys, and in the south-east its northern limit varies from Valdosta, Ga. to a line about 100 miles south, according to the severity of the winter [see TATE—*V. B.* **6.** 598, and BARRETT—*V. B.* **9.** 247].

An encouraging reduction in hornfly nuisance to cattle was obtained by use of automatic fly traps. Feeding phenothiazine, in a minimum dose of 22 mg. per kg. body weight, was found to prevent development of the larvae in faeces, but caused discoloration of the milk of dairy cattle and appeared to produce digestive disturbance.

Brief references are made to a method of controlling warbles by use of a derris-soap wash, and to a sulphur-derris dip for controlling keds and lice on sheep, goats, and cattle.

—J. MACLEOD.

UNITED STATES OF AMERICA. (1938). **Report of Work on Poultry Diseases at North Carolina Agricultural Experiment Station, 1937.** [DEARSTYNE, R. S.].—*Rep. N.C. agric. Exp. Sta., 1937.* pp. 72–74 and 76–77.

Investigations were made on SEPTICAEMIC DISEASES among fowls in North Carolina. From 1934–36 three flocks were tested for the presence of normal agglutinins to *Salmonella pullorum*. In the first flock there was a steady increase of normal agglutinins over a period of 16 months of approximately from 20–55%. In the second flock all birds showed normal agglutinins from the start and continued to do so, while in the third flock the incidence of normal agglutinins was found to be uniformly present. These so-called normal agglutinins were found to be heat stable.

A search for a "virulence" antigen in *S. pullorum*, *S. gallinarum* and *S. typhimurium* was made, but the work was of a preliminary nature and no definite conclusions could be drawn.

Studies were made during an outbreak of PARATYPHOID in a commercial pigeon loft, the causal organism being identified as *S. typhimurium*; 55 of 500 birds tested reacted to the rapid whole-blood agglutination test. Details are given of the lesions in affected pigeons.

Fifty-eight of 89 chickens examined were found to harbour one or more species of tapeworm. Five different species of tapeworm were identified and those transmitted by flies, namely *Raillietina tetragona*, *R. cesticillus*, and *Hymenolepis carioca* were most prevalent. Work was done on the relationship of tapeworm infestation to LEG WEAKNESS and BLINDNESS, but no conclusions are given.—R. F. GORDON.

PANAMA. (1941). **Annual Report of the Gorgas Memorial Laboratory, 1940.** pp. 19. [Items of veterinary interest pp. 3–5 and 9–10]. Washington, D.C.: Govt. Printing Off. [8vo].

Owing to new constructional work on lock gates for the Canal, the veterinary station at Miraflores had to be moved. It was transferred to Corozal, three miles from Panama City, and it will henceforth be known as Corozal Farm Veterinary Station of the Gorgas Memorial Laboratory.

Work was done on *Strongylus vulgaris* infestation in horses and on *Trypanosoma vivax* infection in cattle. The latter parasite evidently reached Panama in cattle from Colombia. It was determined that the common small laboratory animals are not susceptible. The trypanosome was, however, maintained in goats. It has low pathogenicity and hardly ever causes death. *T. ingens*, "a non-pathogenic trypanosome of antelopes", was seen in a cow. It is larger than *T. theileri* which also occurs in Panama.—J. E.

BOOK REVIEWS

MERCHANT, I. A. [D.V.M., Ph.D., Associate Professor of Veterinary Hygiene, Division of Veterinary Medicine, Iowa State College, Ames, Iowa], & KARLSON, A. G. [D.V.M., M.S., Division of Veterinary Medicine, University of Minnesota, St. Paul, Minn.]. (1941). **Laboratory Manual for Veterinary Bacteriology.** pp. 76. 1 appendix. Minneapolis, Minn.: Burgess Publishing Company. [4to] [$ 1·75].

This manual, the first of its kind to be published in the field of applied veterinary bacteriology, is to be recommended to veterinary students, to veterinarians engaged in a bacteriological "refresher" course, and to laboratory asistants training to be bacteriological technicians in a veterinary laboratory, as a very useful practical adjunct to a course of lectures in veterinary bacteriology. The parts dealing with general bacteriological and immunological technique are most comprehensive and the exercises in pathogenic bacteriology alone are necessarily limited in scope to only important representative species of each genus, but include full practical details of up-to-date diagnostic methods. The appendix contains concise but accurate descriptions of special staining methods, selective culture media, and differential metabolic tests. The clarity of the print, the ample list of appropriate reference books and periodicals, the stimulating *questionnaire* on each exercise, the loose-leaf system of presentation with blank pages inserted for note-taking, and the inclusion of descriptive charts which foster systematic habits of study, are all features which combine to make the manual a very acceptable companion for any practical course in veterinary bacteriology.

—R. O. MUIR.

EDDY, W. H. [Ph.D., Professor of Physiological Chemistry, Teachers College, Columbia University]. (1941). **What are the Vitamins?** pp. 247. 4 plates, 2 appendixes. New York: Reinhold Publishing Corporation. [8vo] [$ 2.50].

A chapter on the nature of the vitamins and one on their general function introduce the subject simply and clearly. Each vitamin is afterwards listed and described in detail from the functional and pathological point of view; chemical details are given in an appendix. Although the book is written primarily from the human point of view, the relationship of the vitamins to animal pathology is discussed and it is pointed out that many of the growth factors are concerned with animal physiology and have not yet been proved necessary for the human subject. The relation of the vitamins to hormones, enzymes, and coenzymes is dealt with. The human requirements for vitamins and their distribution in common foodstuffs are tabulated. The subject matter is up-to-date and is treated simply yet exhaustively, and veterinarians should find it an interesting and useful guide to a knowledge of the vitamins.

—J. P. GARDNER.

STEINACH, E. [M.D., Ph.D., Formerly Professor of Physiology at the University of Vienna], & LOEBEL, J. [M.D.] (1940). **Sex and Life. Forty Years of Biological and Medical Experiments.** pp. 308. 67 figs. on 39 plates. London: Faber & Faber Ltd. [8vo] [18s.]

The work of a man who has devoted his life to the scientific study of sex physiology is naturally of the widest human interest, although the lay mind often does Steinach an injustice by associating his name only with surgical schemes for the restoration of sexual function. The motive in writing the book was to dispel half-truths in the public mind by publishing a popular scientific account of all his researches and doctrines. In doing this, Steinach writes in the first person, retracing the pathway along which he set out as a young investigator and showing the fashion in which his experiments opened up a vista, not of perpetual youth but of a bearable old age in which mental faculties and physical health are preserved as long as nature permits.

The autobiographical touch is retained throughout and makes the book as easy to read as a novel. The numerous anatomical illustrations are of great interest to the biologist but are all intelligible to the lay reader. In the text he deals in succession with physical and psychic sex characters, reimplantation of sex glands, the endocrine system in its bearing on sex, the feminization of males and masculization of females, transplantation of sex glands in human beings, experimental hermaphrodites, sources of sex hormones, experimental precocity, manifestations of senescence, surgical reactivation by vasoligation in animals and man, reactivating effects of sex hormones, and clinical use of synthetic male and female hormones.—H. H. GREEN.

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